Supplementary Materials

A systematic review and meta-analysis of associations between green and blue spaces and birth outcomes

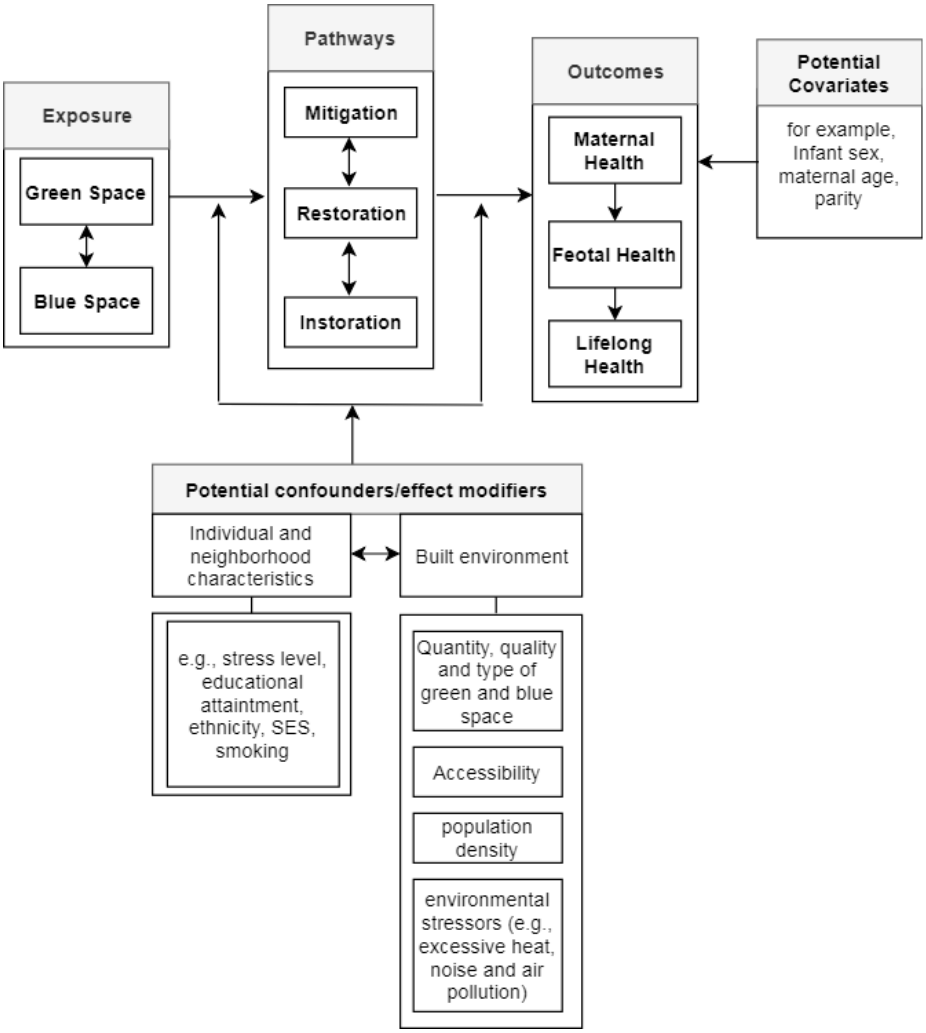

Figure S1. Assumption on Potential Pathways between Green and Blue Space and Pregnancy Outcome

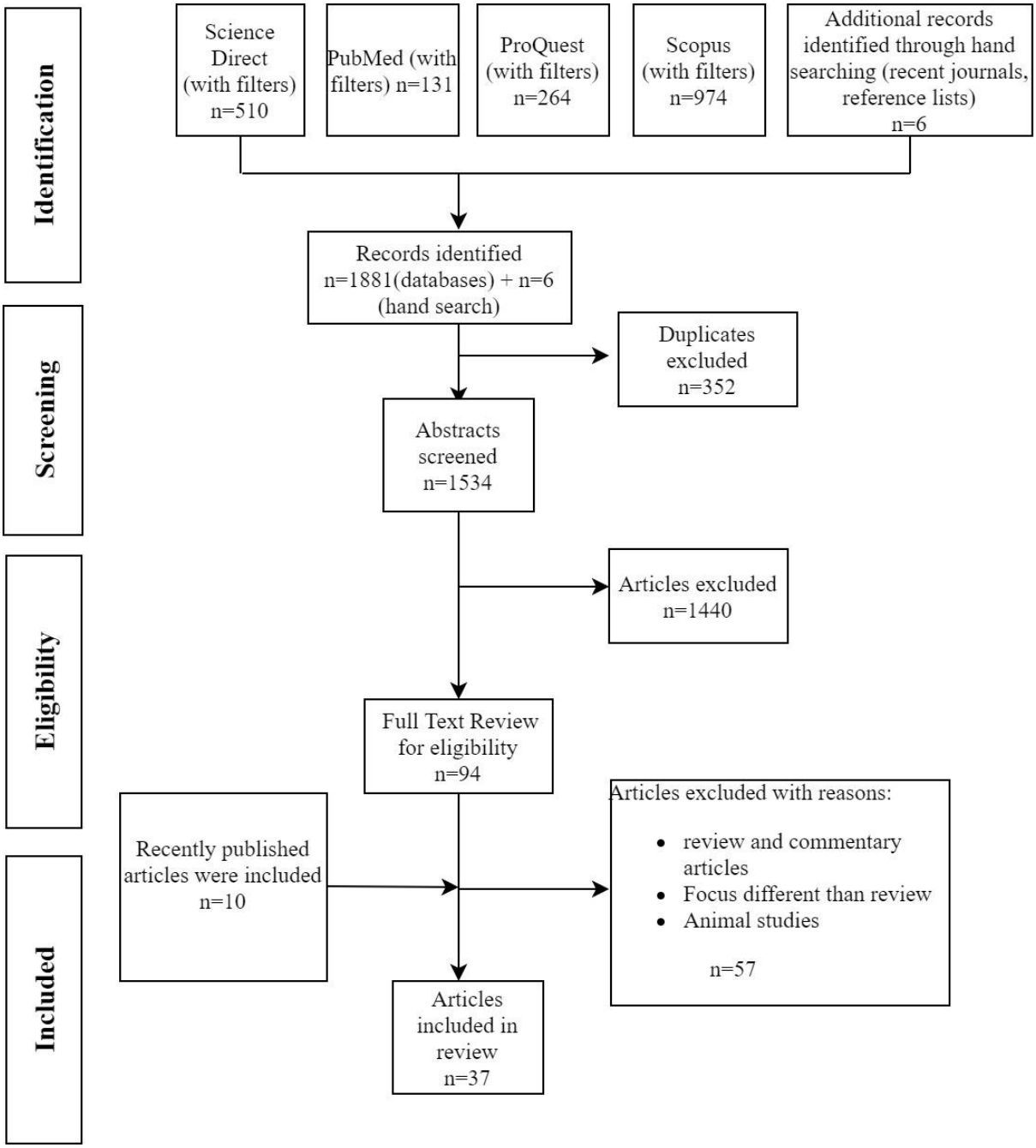

Figure S2. Selection process of included articles

Database	Search Terms	Results found	Date last searched
Science Direct	Title, abstract or author-specified keywords: "urban green space" OR "green space" OR trees OR "natural environment" OR vegetation OR "blue space" OR "aquatic place" OR coast AND "birth outcomes" OR "perinatal health outcomes" OR "pregnancy outcomes"	510	13/12/2018
PubMed	Search (((((((("green space") OR "urban green space"[Title/Abstract]) OR "natural environment"[Title/Abstract]) OR "vegetation"[Title/Abstract]) OR "park"[Title/Abstract]) OR "trees"[Title/Abstract]) AND "pregnancy outcomes"[Title/Abstract]) OR "birth outcomes"[Title/Abstract]) OR "perinatal health outcomes"[Title/Abstract]) OR "perinatal health"[Title/Abstract] AND Journal Article[ptyp] OR "blue space"[Title/Abstract]) OR "aquatic place"[Title/Abstract]) OR coast[Title/Abstract]) AND free full text[sb] AND Humans[Mesh] AND English[lang]	131	13/12/2018
ProQuest	ab("green space") OR ab("urban green space") OR ab("blue space") OR ab("aquatic place") OR ab("coast") AND ab("pregnancy outcomes") OR ab("birth outcomes") OR ab("perinatal health") OR ab("perinatal health outcomes")Limits applied Databases: ProQuest Central Limited by: Full text, Peer reviewed, Narrowed by: Full text: Full text; Document type: Article; Language: English; Peer reviewed: Peer reviewed	264	13/12/2018
Scopus	TITLE-ABS-KEY ("urban green space") OR TITLE-ABS ("green space") OR TITLE-ABS-KEY (vegetation) OR TITLE-ABS-KEY (trees) OR TITLE-ABS-KEY ("blue space") OR TITLE-ABS-KEY ("aquatic place") AND TITLE-ABS-KEY ("pregnancy outcomes") OR TITLE-ABS-KEY ("perinatal health outcomes") OR TITLE-ABS-KEY ("birth outcomes") AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (DOCTYPE , "ar"))	974	13/12/2018

Table S1. Digital Search Strategy

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	TOTAL POSITIVE	TOTAL APPLICABLE	PERCENTAGE	RANKING
2019, Asta et al.	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH
2019, Choe et al	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH
2019, Donovan et al.	Y	Y	Y	Y	N	N	N	Y	Y	NA	Y	NR	NA	Y	8	12	0.66	MODERATE
2019, Dzhambov et al.	Y	Y	Y	Y	N	N	N	Y	Y	NA	Y	NR	NA	Y	8	12	0.66	MODERATE
2019, Eriksson et al.	Y	Y	Y	Y	N	N	N	Y	Y	NA	Y	NR	NA	Y	8	12	0.66	MODERATE
2019, Laurent et al.	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	NR	NA	Y	11	13	0.84	HIGH
2019, Liao et al.	Y	Y	Y	Y	N	N	N	Y	Y	NA	Y	NR	NA	Y	8	12	0.66	MODERATE
2019, Nieuwenhuijsen et al.	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH
2019, Schinasi et al.	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH
2019, Seabrook et al.	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH

2019, Sun et al.	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH
2019, Yin.	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	NR	NA	Y	8	12	0.66	MODERATE
2018, Agay-Shay et al.	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	NR	NA	Y	11	13	0.92	HIGH
2018, Cusack et al.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	CD	NR	Y	12	14	0.86	HIGH
2018, Fong et al.	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH
2018, Glazer et al.	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH
2017, Richardson Et al.	Y	Y	CD	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	8	12	0.66	MODERATE
2017a,Nichani et al.	Y	Y	Y	Y	Y	Y	N	Y	Y	NA	Y	CD	Y	Y	11	13	0.84	HIGH
2017b, Nichani Et al.	Y	Y	Y	Y	Y	Y	N	Y	Y	NA	Y	CD	Y	Y	11	13	0.84	HIGH
2017, Cusack Et al.	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH
2017, Abelt, K., & McLafferty, S.	Y	Y	CD	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	8	12	0.66	MODERATE

2016, Young Et al.	Y	Y	Y	Y	Y	N	N	N	Y	NA	Y	NR	NA	Y	8	12	0.66	MODERATE
2016, Ebisu Et al.	Y	Y	CD	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	8	12	0.66	MODERATE
2016, Cusack Et	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	NR	NA	Y	11	13	0.92	HIGH
2016, Casey Et al.	Y	Y	Y	Y	Y	CD	N	Y	Y	Y	Y	NR	NA	Y	10	13	0.77	HIGH
2015, McEachan Et al.	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH
2015, Grazuleviciene Et al.	Y	Y	Y	Y	N	CD	CD	Y	Y	N	Y	Y	NR	Y	9	14	0.64	MODERATE
2014, Hystad Et al.	Y	Y	Y	Y	Y	Y	Y-CD	Y	Y	Y	Y	NR	Y	Y	12	14	0.86	HIGH
2014, Dadvan Et Al. (residential prox.)	Y	Y	CD	Y	CD	N-CD	CD	Y	Y	CD	Y	Y	Y	Y	9	14	0.64	MODERATE
2014, Agay-Shay Et al.	Y	Y	Y	Y	Y	N	N	Y	Y	NR	Y	NR	NA	Y	9	12	0.75	HIGH
2014, Dadvand Et al.	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH

2013, Laurent Et al	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH
2013, Kihal-Talantikite Et al.	Y	Y	Y	Y	CD	N	N	Y	Y	NA	Y	NR	NA	Y	8	12	0.67	MODERATE
2013, Markevych Et al.	Y	Y	Y	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	9	12	0.75	HIGH
2012, Dadvand Et al.	Y	Y	Y	Y	N	N	N	Y	Y	NA	Y	NR	NA	Y	8	12	0.67	MODERATE
2011, Dadvand Et al.	Y	Y	Y	Y	N	N	N	Y	Y	NA	Y	NR	NA	Y	8	12	0.67	MODERATE
2010, Donovan Et al.	Y	Y	CD	Y	Y	N	N	Y	Y	NA	Y	NR	NA	Y	8	12	0.67	MODERATE

Table S2. Quality Assessment

*CD, cannot determine; NA, not applicable; NR, not reported; Y, yes: N, no

Year, Author, Title	Country	Aims	Study design	Population, Time Frame	Exposure	Outcome	Mediation/ effect modification	Main findings
2019, Asta et al.	Italy	To analyse the effect of greenness on the association between exposure heat and air pollution and preterm birth	Cross-sectional	56,576 singleton live births, 2001-2013	residential proximity to green spaces and the Normalized Difference Vegetation Index (NDVI) within a100m buffer of a mother's residential address	Preterm birth (PTB)	The association between heat exposure and preterm was modified by Socio-economic position (SEP) and residential proximity to green spaces. No effect modification was found for NDVI.	Exposure to increased heat and PM_{10} was associated with increase probability of preterm births.
2019, Choe et al.	USA	To analyse the effect of residential natural and built environment's features on gestational diabetes mellitus (GDM), gestational hypertension, pre-eclampsia	Cross-sectional	61,640 women, 2002-2012	Mother's residential proximity to recreational facilities, proximity to fresh water and coasts	GDM, gestational hypertension, pre-eclampsia	NA	Living within 1 km of the coast was associated with lower odds of GDM. Living within 500 m of a recreational facility was associated with lower odds of gestational hypertension
2019, Donovan et al.	USA	To analyse the impact of residential greenness on Small for gestational age (SGA), PTB, very	Cross-sectional	14,682 singleton live births	Metrics from LIDAR and those based on NDVI within 60m, 120m and 240m buffer of a mother's	SGA, PTB, VPTB	NA	The mean of vegetation height and variation in vegetation height was associated with lower odds of SGA. Green space metrics

		preterm birth (VPTB)			residential address			were not associated with PTB or VPTB
2019, Dzhambov et al.	Austria, Italy	To investigate the relation of residential greenness, traffic noise and air pollution with birth outcomes.	Cross-sectional	1091 cases (573 from UIT, 518 from BBT).	NDVI within 100m, 300m, 500m and 1000m around the mother's residential address	BW, LBW, PTB, SGA	In UIT sample, the association between greenness and birthweight was stronger among first born babies and when the air pollution level was low. In BBT sample, altitude modified the association.	In the Lower Inn Valley, greenness was associated with lower odds of LBW and SGA whereas, in BBT the association was not statistically significant.
2019, Eriksson et al.	Sweden	To investigate association between NDVI and birth outcomes.	Cross-sectional	Birth weight (n=2619), birth length (n=2490), head circumference (2243), 1994-1996	NDVI within 500-m buffers around residential address	BW, birth length, head circumference, SGA	NDVI was associated with increased birth weight among those from suburban areas.	There was no association between NDVI and birth weight, birth length or head circumference.
2019, Laurent et al.	USA	To investigate association between LBW and residential greenness.	Case-cohort	72,632 LBW cases, 2001-2008	NDVI within 500-m buffers around residential address	Term low birth weight (TLBW)	Fine particulate matter partly mediated (%12) the association between NDVI and LBW.	Increase of NDVI was associated with lower odds of LBW.
2019, Liao et al.	China	To investigate the association between residential greenness and Maternal blood glucose levels,	Cohort	6807 pregnant women, 2012-2015	NDVI within 300-m buffers around residential address	Maternal blood glucose levels, IGT , GDM	PM2.5 partly mediated the association between residential NDVI and maternal	Increase of NDVI was associated with decrease of maternal fasting glucose levels,

		impaired glucose tolerance (IGT) , gestational diabetes mellitus (GDM)					fasting glucose levels.	lower risks of IGT and GDM.
2019, Madhloum et al.	Belgium	To investigate the association between newborn blood pressure (BP) and land use indicator	Cross-sectional	427 mother-newborn pairs, 2014-2016	Residential greenness within 5 km buffer of the residential address	Newborn BP	NA	Increment in greenness percent was associated with lower systolic and lower diastolic BP
2019, Nieuwenhuijsen et al.	UK, France, Spain, Lithuania, Norway, Greece	To analyse association between urban exposome and birth weight.	Cross-sectional	31,458 singleton pregnancies	NDVI within 100-m,300-m,and 500-m buffers around residential address	BW, TLBW	NA	Increased level of NDVI was associated with increased birth weight
2019, Schinasi et al.	USA	The association between greenness and infant mortality	Cross-sectional	2010-2014	NDVI within 250-m buffers in each census tract	Infant mortality	No interactions were statistically significant	Increase of NDVI was associated with reduced rate of infant mortality
2019, Seabrook et al.	Canada	To investigate influence of environmental factors on LBW and PTB	Cohort	25,263 live births, 2009-2014	Percentage of park and recreation land use to all land uses within 500 m of a postal code, NDVI within a 500 m and 1,600 m buffer of a postal code	LBW, PTB	No interactions were statistically significant	Increase of NDVI was associated with lower odds of LBW

2019, Sun et al.	China	To investigate the modification effect by residential greenness on the association between maternal exposure to ambient temperature and the risk of miscarriage	Case-control	2044 miscarriage cases and 2285 controls, 2014-2016	NDVI within 500 m and 1000 m from residential address of the mother	Miscarriage	The effect of temperature on the risk of miscarriage was less prominent among participants lived in higher amount of greenness compared with those exposed to lower amount of greenness.	Maternal exposure to moderately high temperature was associated with increased risk of miscarriage.
2019, Yin.	USA	To investigate the effect of mother's exposure to residential greenness on BW	Cross-sectional	138,532 birth, 2000–2002	NDVI, percent tree canopy, neighbourhood green index(NHGI) within 100m, 250m, 500m, and 1000m of the residential address of the mother and proximity to parks.	TBW, TLBW	The association between greenness and birthweight was stronger among highest SES groups.	Higher levels of NGHI was associated with increased birth weight. No statistically significant association was observed between greenness metrics and the risk of low birth weight
2018, Agay-Shay et al.	Israel	To evaluate association between variance in residential greenness and birth outcomes	Cross-sectional	73221 live births, 2000-2014	NDVI and percentage of tree cover at 300 m from mother's residential address	BW, LBW, PTB, very preterm delivery, SGA, appropriate for gestational age (AGA)	Stronger association between higher NDVI and birth weight was found among lower SES groups.	Increase in mean and variance of NDVI was associated with lower odds for low birth weight, small for gestational age and preterm birth. Larger

								number of trees were associated with increased birth weight.
2018, Cusack et al.	Canada	To examine associations between mother's residential green space and term birth weight	Cross-sectional	2510 births, 2009-2012	NDVI within 100 m, 250 m, 500 m, 1000 m from residential address of the mother	TBW	Stronger association between NDVI and birth weight was found among higher SES groups.	Association between NDVI and birth weight was positive but not statistically significant. Pathways did not explain the association
2018, C. Fong et al.	USA	to investigate the relationship between residential greenness and birthweight	Cross-sectional	n=780,435, 2001-2013	NDVI within 250 m from the mother's residential address	TBW, TLBW, SGA	TLBW and SGA appeared stronger among population with higher SES groups.	Greenness was associated with higher term birthweight lower odds of TLBW and SGA.
2018, Glazer et al.	USA	to investigate association between green and blue space and birth outcomes in a coastal area	Cross-sectional	61,640 mother-infant pairs, 2001-2012	NDVI within 150, 250, 500 m from the residence of the mother, residential proximity to fresh water	Gestational age (GA), PTB TBW, SGA	lower odds of preterm birth associated with residential proximity to freshwater among those in the highest NSES tertile	Higher birth weight and living near to fresh body was associated.
2017, Richardson Et al.	UK	To investigate whether changing mother's exposure to natural space between births has effect on BW	quasi-experimental	40 194 singleton births, 1991-2010	natural space (total, accessible, parks, woods and open water) within	BW	Association was stronger among motherS who had already children before and had high education	Association found between BW and total amount of natural space, however specific

					100 m buffer from the mother's residence at the time of birth			types of natural space does not show association.
2017a, Nichani Et al.	New Zealand	To investigate if mother's exposure to green space during pregnancy has effect on BW and GA	Cross-sectional	5091 mother-newborn, 2007-2010	The percentage of green space in each urban or rural census area unit (CAU) was used	BW, GA	Green space and gestational age association exists among infants of women with the lowest level of education.	in fully adjusted models association between green space and birth outcomes is not statistically significant among general population.
2017b, Nichani et al.	New Zealand	To investigate association between exposure to green space during pregnancy associated and depression and identify moderating factors	Cross-sectional	6772 women, 2009-2010	Proportion of Green space within a census area unit	Antenatal and postnatal depression	No interactions were statistically significant	No significant association was found between neonatal depression and green space
2017, Cusack, L., et al.	US	Investigate how contextual and population differences affected green space associations with birth weight	Cross-sectional	N=3026603, 2005-2009	NDVI, % tree cover, % green space, % street tree within 50-1000 m buffer distances from mothers residential	TBW	Maternal race, ethnicity and education has largest effect on the association	consistent positive associations were observed for the high density areas of both cities using

					address, and access to parks			several green space metrics at small buffer distances
2017, Abelt, K., & McLafferty, S.	US	To investigate maternal exposure to green and blue spaces and adverse birth outcomes	Cross-sectional	mothers n = 103,484, 2000	NDVI within 100 m, 250 m, and 500 m circular buffers from mother's residence, number of street trees, and access to major green spaces, proximity to waterfront areas	PTB, TBW, TLBW and SGA	Positive association was observed between NDVI and odds of SGA among deprived populations	Significant association between street trees nearby residential area and PTB prevelance was observed not with other metrics.
2016, Young Et al.	US	To determine the risk of gestational diabetes (GDM) and preeclampsia associated with various community resources	ecological study	all singleton birth records 2007- 2008	Fast food restaurants, supermarkets, grocery stores, gyms, health clubs and green space	prevalence risk of gestational diabetes (GDM) and preeclampsia	Not reported	The distribution of community resources has significant association with the risk of developing GDM while not with preeclampsia
2016, Ebisu Et al.	US	To investigate associations between urban and green land-use and birth weight	Cross-sectional study	239,811 birth certificate data, 2000-2006	PM2.5, traffic exposure (highways that are 2 km from the residence of mother)	TBW, TLBW, SGA	Results did not provide strong evidence of effect modification by maternal race and SES	There is protective associations by green space on birth outcomes and

					proportion of greenness within 250 m from mother's address			urban space showed negative association with birth outcomes
2016, Cusack Et al.	US	To investigate association between residential greenness and birth outcomes	Cross-sectional	3,026,603 births 2000-2009	NDVI within 250 m from mother's residence	PTB, TBW, SGA	Maternal and paternal race, ethnicity and education had the largest impact on reducing associations.	No consistent associations between residential greenness and birth outcomes in adjusted models.
2016, Casey Et al.	US	To investigate association between prenatal residential greenness and birth outcomes	Cross-sectional	12,821 infants 2006–2013	NDVI 250 m and the 1250 m radius including and surrounding the home address	TBW, SGA, PTB, 5 min Low Apgar score	No modification by Medical Assistance or CSD	greater greenness was associated with lower odds of preterm and small for gestational age among mothers in cities but not with TBW and 5 min Low Apgar score
2015, Grazuleviciene, R., et al.	Lithuania	To investigate association between residential greenness or distance to city parks and birth outcomes	Cohort	N=3292, 2007-2009	NDVI buffers within 100 m, 300 m, and 500 m of each maternal residence and distance to a city park	BW, TLBW, LBW, GA, PTB,	The beneficial park effect on foetal growth is most apparent in the environment with low surrounding greenness	Longer distances to city parks was associated with an increased risk of PB and smaller GA. Association was found between low

								surrounding greenness and TLBW
2015, McEachan Et al.	UK	To investigate association between green space and depression during pregnancy and to investigate moderating and mediating variables	Cross-sectional	7547 women during pregnancy period, 2007-2011	NDVI within 100 m, 300 m and 500 m buffer zones around participant addresses and access to major green spaces	depressive symptoms during pregnancy	Associations may be stronger for more disadvantaged groups and for those who are already physically active	Pregnant women in the greener quintiles were 18–23% less likely to report depressive symptoms compare to those in the least green areas
2014, Hystad Et al.	Canada	to investigate associations between residential greenness and birth outcomes and evaluate the influence of built environment factors on these associations	Cross-sectional	birth outcomes in a cohort of 64,705 singleton births, 1999-2002	NDVI for each address was calculated within 100m, 250m. Residential noise exposure. Neighbourhood walkability	PTB, VPTB, TBW, SGA	After adjustment of air pollution and noise exposures, neighborhood walkability, and park proximity association remained significant	positive association found between residential greenness and birth outcomes.
2014a, Dadvand Et Al.	Spain	To investigate the association between mothers' residential proximity to major roads and term LBW, and to explore possible	Cross-sectional	6438 singleton term births, 2001-2005	Road proximity (200 m from a major road) air pollution, noise, and heat. Tree coverage in a 200-m buffer	TLBW, SGA	Air pollution and heat exposures mediated the LBW and distance to major roads	Increased risk of term LBW associated with proximity to major roads.

		mediators for this association			around major roads			
2014b, Dadvand Et al.	UK	To investigate the association between residential greenness and proximity to green spaces and BW and to explore the potantial modifiers for this association	Cross-sectional	10,780 singleton live-births, 2007-2010	NDVI within 50 m, 100 m, 250 m, 500 m and 1000 m around maternal residence . Residential proximity to green spaces	BW	SES, education and ethnicity mediated the association	Level of greenness in Residential surrounding is associated with healthier foetal growth.
2014, Agay-Shay Et al.	Israel	To investigate associations between surrounding greenness, distance to green spaces and pregnancy outcomes	Cross-sectional	39 132 singleton live births, 2000-2006	NDVI within a buffer of 250m sensitivity analysis 100m and 500m and proximity to major green spaces	GA, LBW, TLBW, VLBW, PTB, VPTB	Stronger associations were observed among those of lower socioeconomic status.	Significant association between greater greenness and BW but not with GA, PTD, VPTD.
2013, Laurent Et al.	US	To investigate association between green space exposure and preeclampsia	Cross-sectional	81,186 infants, 1997-2006	NDVI value in circular buffers of 50, 100 and 150 m radii around homes	TBW,PTB, preclampsia	Significance disappears for the 100 m buffer after adjustment for NOx, O3 or CO.PM2.5 or traffic density	Association was observed between increased TBW, reduced risk of PB and exposure to greenness. No association with PC was observed.

2013, Kihal-Talantikite Et al.	France	To investigate the relationship between green spaces and the infant mortality	ecological	All infant deaths ,2000-2009	Proportion of the geographical area (km2) of green space in the total area)	All infant deaths (between 2000-2009)	Not reported	After adjusting for greenness and neighborhood deprivation level, high risk cluster of infant mortality disappeared
2013, Markevych Et al.	Germany	To investigate association between residential greenness and BW also to explore underlying mechanisms	Cross-sectional	3203 newborns, 1996-1999	NDVI within 100-m,250-m, 500-m and 800-m buffers and forests, parks and forests and parks within 500-m buffer from the mother's residence	BW	Strongest association found among mother who have less than 10 years of school education. Association remained significant also after adjusting for noise or maternal stress during pregnancy	Birth weight was positively associated with surrounding greenness in a 500-m buffer around the residence at birth, but not with neighbourhood green spaces within same buffer distance.
2012b, Dadvand Et al.	Spain	To investigate surrounding greenness and birth outcomes	Cross-sectional	2393 singleton live births, 2003-2008	NDVI 100m, 250m, 500m buffers around residence of participants	TBW, head circumference, GA	Stronger associations among children of mothers with lower education, suggesting greater benefits from surrounding greenness	There is beneficial effects of surrounding green spaces on measures of birth weight and head circumferences but not pregnancy length

2012a, Dadvand Et al.	Spain	To investigate surrounding green spaces and distance to major green spaces effect on pregnancy outcomes and to explore effect of SES in this association	Cross-sectional	8246 birth cohort, 2001-2005	NDVI in buffer of 100 m around each maternal place of residence and proximity to major green spaces	BW, GA	beneficial effect of exposure to green spaces on BW found among the lowest SEP group and those who had less than 10 year of school education	None of the indicators of green exposure was associated with birth weight and gestational age.
2010, Donovan Et al.	US	To investigate whether there is association between greater tree-canopy cover and reduced risk of unfavorable birth outcomes	Cross-sectional	All singleton births in Oregon, 2006-2007 N=5696	Tree canopy in the 50, 100, and 200m buffers around the centroid of each mother's house was calculated using classified aerial imagery	PTB, SGA	Not reported	Increase in tree-canopy cover within 50 m of a house ,and proximity to a private open space, were associated with a reduced risk of SGA.

Table S3. Characteristics of studies

Variables			Number of studies	Total number
Exposure	Green Space	NDVI (satellite images)	27	37

Table S4. outcome variables

Exposure and used in articles					
			proportion of green spaces(Land use data)	9	
			Tree canopy	6	
			Distance to green space	11	
		Blue Space	Distance to coast	2	5
			Distance to fresh water	3	
			Proportion of fresh water body	2	
	Outcomes	Infant	Foetal Growth	28	32
			Gestation Length	16	
			Other Outcomes	7	
		Maternal	Depressive Symptoms	2	6
			Hypertension	1	
			Preeclampsia	3	
			Gestational Diabetes	3	

Study		Exposure Type	Buffer Distance	Exposure Type	Increase in Exposure	SD (green space proxy)	SD (BW)	B	β	SE (B)	UCI (B)	LCI (B)	SE (β)	LCl (β)	UCl (β)
2019, Eriksson et al.		NDVI	500 m	IQR increase	0.167	0.06	484	7.3	0.0037	30.10	66.2	-51.7	0.0040	-0.0064	0.0082
2019, Dzhambov et al	UIT survey	NDVI	300 m	IQR increase	0.189	0.14	528.76	61.64	0.016	33.194	126.7	-3.42	0.0088	-0.0009	0.0340
	BBT survey	NDVI	300 m	IQR increase	0.148	0.11	564.71	12.32	0.0024	26.852	64.95	-40.31	0.0052	-0.0078	0.013
2019, Yin.		NDVI	100 m	IQR increase	0.1349	0.1	472.1	2.06	0.0004	1.727040816	5.44	-1.33	0.0004	-0.0003	0.0012
2019, Nieuwenhuijsen et al.		NDVI	300 m	IQR increase	0.175	0.1	546.6	30.7	0.0056	4.184	38.9	22.5	0.0008	0.0041	0.0071
2018, Agay-Shay et al		NDVI	300 m	Tertiles	0.02698	0.03	534	19.6	0.0011	4.413	21.5	4.2	0.0002	0.0006	0.0016

2018, Cusack et al	NDVI	250 m	IQR increase	0.1	0.11	498	12.7	0.002	12.372	36.9	-11.6	0.0027	-0.0026	0.0082
2018, Fong et al	NDVI	250 m	0.1 unit increase of mean NDVI, Q4 vs. Q1	0.22	0.05	468	4.63	0.0005	1.028	4.1	0.1	0.0001	0.00028	0.0007
2018, Glazer et al.	NDVI	250 m	IQR increase, SD:0.15	0.20235	0.15	563	7.7	0.0021	4.184	15.9	-0.5	0.0011	-0.00013	0.0042
2017, Cusack et al. Austin	NDVI	250 m	IQR increase	0.1	0.119	447.7	-3	-0.0008	2.3	4.2	−7.5	0.0006	-0.00199	0.0004
2017, Cusack et al. Portland	NDVI	250 m	IQR increase	0.1	0.133	456.7	1.2	0.0004	2.3	1.3	-3.3	0.0007	-0.00098	0.0017
2017, Abelt Et al.	NDVI	250 m	increase in mean NDVI SD:0.10	0.1349	0.1	477.01	9.01	0.0019	4.601	-32.4	50.4	0.0010	0	0.0038
2016, Ebisu et al.	Green space (land use data)	250 m	IQR increase	0.38	0.29	463.5	3.2	0.0020	1.429	6.0	0.4	0.0009	0.0003	0.0038
2016, Cusack et al.	NDVI	250 m	Quantiles of NDVI (Q1, Q2, Q3 and Q4),	IQR=0.15	0.111	485.0474	1.9	0.0004	0.918	3.7	0.1	0.0002	0.00002	0.0008
2016, Casey et al.	NDVI	250 m	Tertiles	tertile cut off point: 0.43	0.05	485.0474	42	0.0043	21.939	85.0	-1.0	0.0023	-0.0001	0.0088
2015, Grazuleviciene et al.	NDVI	300 m	IQR increase	0.09	0.066	527.85	11.2	0.0014	9.200	25.5	−3.1	0.0012	-0.00085	0.0037
2014, Haystad et al.	NDVI	100 m and 250m were	IQR increase	0.1	0.08	472	20.6	0.0035	2.092	24.7	16.5	0.0004	0.002797	0.0042

		highly correlated												
2014, Agay-Shay et al.	NDVI	250 m	IQR increase	0.0578	0.04	427.6	19.2	0.0018	3.010	25.1	13.3	0.0003	0.001244	0.0023
2014b, Dadvand et al.	NDVI	250 m	IQR increase	0.15	0.111	489.2513	16.2	0.0037	7.423	30.8	1.7	0.0017	0.000375	0.0070
2013, Laurent et al.	NDVI	150m	IQR increase	0.131	0.11	485.0474	0.59	0.0001	1.291	3.1	-2.0	0.0003	-0.000044	0.0007
2014, Markevych et al.	NDVI	250 m	IQR increase	0.107	0.09	423.2	18.3	0.0039	8.954	35.8	0.7	0.0019	0.000159	0.0076
2012b, Dadvand et al.	NDVI	250 m	IQR increase	0.188	0.14	480.9	29.2	0.0085	14.133	56.9	1.5	0.0041	0.000437	0.0166
2012a, Dadvand et al.	NDVI	100 m	10% increase	0.008	0.03	547	-19.8	-0.0011	24.413	28.1	−67.6	0.0013	-0.000371	0.0015
2017a, Nichani et al.	Green space (land use data)	Census unit	IQR increase	26%	28	509	12.16	0.6689	7.742	27.3	−3.01	0.4259	-0.16585	1.5037
2017, Richardson et al.	Green space (land use data)	100 m[a]	IQR increase	18.9 %	14.01	518.9029	8.19	0.2211	2.939	14.0	2.4	0.0793	0.06561	0.37665

Table S5. Extracted data and effect size computations for meta-analysis on birth weight ;SD- standard deviation; BW- birth weight; B-unstandardized regression coefficient ;β-standardized regression coefficient; SE-standard error; UCI: upper 95% confidence interval; LCI- lower 95% confidence interval.

* [a] Buffer distance is calculated from postcodes (the buffer distance is calculated from point address of mother's residence in other studies)

Study	β for 10% increase in green space proxies	LCI(β)	UCI(β)	SE(β)
2019, Eriksson et al.	0.00008	-0.00008	0.0002	0.0004
2019, Dzhambov et al. (UIT)	0.0033	-0.0002	0.0068	0.0088
2019, Dzhambov et al (BBT)	0.00048	-0.0016	0.0025	0.0052
2019, Yin.	0.00018	-0.0013	0.0016	0.0037
2019, Nieuwenhuijsen et al.	0.0011	0.0008	0.0014	0.0008
2018, Cusack et al.	0.0006	-0.0005	0.0016	0.0027
2018, Fog C. et al.	0.0002	0.0001	0.0003	0.0001
2018, Glazer et al.	0.0004	0.0000	0.0008	0.0011
2017, Cusack et al. (Portland)	-0.0002	-0.0004	0.0001	0.0006
2017, Cusack et al. (Austin)	0.0001	-0.0002	0.0003	0.0007
2015, Grazuleviciene et al.	0.0003	-0.0002	0.0007	0.0012
2014, Agay-Shay et al.	0.0004	0.0002	0.0005	0.0003
2014, Hystad et al.	0.0007	0.0006	0.0008	0.0004
2014b, Dadvand et al.	0.0007	0.0001	0.0014	0.0017
2013, Markevych et al.	0.0008	0.0000	0.0015	0.0019
2013, Laurent et al.	0.0000	-0.0001	0.0001	0.0003
2012, Dadvand et al.et al.	0.0017	0.0001	0.0033	0.0041
2011, Dadvand et al.	-0.0011	-0.0037	0.0015	0.0013

Table S6. Effect size computations for meta-analysis on birth weight based on 10% increase in green space proxies (NDVI and green space percentage) ;a: buffer distance is calculated from postcodes while the buffer distance is calculated from point address of mother's residence in other

studies; β-standardized regression coefficient; LCI- lower 95% confidence interval ; UCI- upper 95% confidence interval; SE- standard error.

Study	β	LCI 95%	UCI 95%	weight (%)
2019, Yin.	0.00008	-0.00006	0.0002	9.55
2019, Dzhambov et al. (UIT)	0.0033	-0.00018	0.007	0.64
2019, Dzhambov et al (BBT)	0.00048	-0.0016	0.0025	0.67
2019, Eriksson et al.	0.00018	-0.0013	0.0016	0.71
2019, Nieuwenhuijsen et al.	0.0011	0.0008	0.0014	3.17
2018, Cusack et al	0.0006	-0.0005	0.0016	1.04
2018, Fong C. et al	0.0002	0.0001	0.0003	26.32
2018, Glazer et al.	0.0004	-0.00003	0.0008	2.04
2017, Cusack et al. Portland	-0.0002	-0.0004	0.00008	4.87
2017, Cusack et al. Austin	0.00007	-0.0002	0.0003	4.08
2015, Grazuleviciene et al.	0.0003	-0.0002	0.0007	1.70
2014, Agay-Shay et al.	0.0004	0.0002	0.0005	19.66
2014, Hystad et al.	0.0007	0.0006	0.0008	14.60
2014b, Dadvand et al.	0.0007	0.00007	0.001	1.37
2013, Markevych et al.	0.0007	0.00003	0.002	1.25
2013, Laurent et al.	0.00003	-0.00009	0.0001	18.25
2012, Dadvand et al.	0.0018	0.00009	0.003	0.84
2011, Dadvand et al.	-0.001	-0.004	0.0015	0.79
Pooled	0.00031	0.00007	0.00055	100
Statistics				
I-squared	88.28	82.08	92.33	
Cochran's Q	110.90			

Table S7. Meta-analysis result for effect of 10% increase in green space proxies (NDVI and green space percentage) on birthweight (excluding Agay-Shay et al (2018), Abelt (2017), Cusack et al (2016), Casey et al (2016)); β-standardized regression coefficient; LCI- lower 95% confidence interval ; UCI- upper 95% confidence interval.

Study	β for 0.1 unit increase in NDVI	LCI(β)	UCI(β)	SE(β)
2019, Yin.	0.0003	-0.0002	0.0008	0.0004
2019, Dzhambov et al. (UIT)	0.0086	-0.0005	0.0178	0.0088
2019, Dzhambov et al (BBT)	0.0016	-0.0053	0.0085	0.0052
2019, Eriksson et al.	0.0004	-0.0029	0.0036	0.0038
2019, Nieuwenhuijsen et al.	0.003	0.002	0.004	0.0008
2018, Cusack et al	0.003	-0.003	0.008	0.003
2018, Fong C. et al	0.0002	0.000	0.000	0.0001
2018, Glazer et al.	0.001	0.000	0.002	0.001
2017, Cusack et al. Portland	-0.0008	-0.002	0.000	0.0006
2017, Cusack et al. Austin	0.0004	-0.001	0.002	0.0007
2015, Grazuleviciene et al.	0.0016	-0.001	0.004	0.001
2014, Agay-Shay et al.	0.0031	0.002	0.004	0.0003
2014, Hystad et al.	0.0035	0.003	0.004	0.0002
2014b, Dadvand et al.	0.0025	0.000	0.005	0.002
2013, Markevych et al.	0.0036	0.000	0.007	0.002
2013, Laurent et al.	0.0001	0.000	0.001	0.0003
2012b, Dadvand et al.	0.0045	0.000	0.009	0.004
2012a, Dadvand et al.	-0.0140	-0.046	0.019	0.001

Table S8. Effect size computations for meta-analysis on birth weight based on 0.1 unit increase in NDVI; β-standardized regression coefficient; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval; SE- standard error.

Study	β for 0.1 unit increase in NDVI	LCI(β)	UCI(β)	weight (%)
2019, Yin.	0.0003	-0.0002	0.0008	2.93
2019, Dzhambov et al. (UIT)	0.009	-0.0005	0.018	0.65
2019, Dzhambov et al (BBT)	0.0016	-0.0053	0.009	0.66
2019, Eriksson et al.	0.0004	-0.0029	0.004	0.71
2019, Nieuwenhuijsen et al.	0.003	0.002	0.004	1.83
2018, Cusack et al	0.003	-0.003	0.008	0.96

2018, Fog C. et al	0.000	0.000	0.000	78.66
2018, Glazer et al.	0.001	0.000	0.002	1.58
2017, Cusack et al. Portland	-0.001	-0.002	0.000	1.46
2017, Cusack et al. Austin	0.000	-0.001	0.002	1.36
2015, Grazuleviciene	0.002	-0.001	0.004	0.91
2014, Agay-Shay	0.003	0.002	0.004	1.75
2014, Hystad	0.003	0.003	0.004	2.85
2014, Dadvand (in)B	0.002	0.000	0.005	1.09
2013, Markevych	0.004	0.000	0.007	1.00
2013, Laurent	0.000	0.000	0.001	4.82
2012, Dadvand	0.005	0.000	0.009	0.88
2011, Dadvand	-0.014	-0.046	0.019	0.84
Pooled	0.0004	-0.002	0.003	100
Statistics				
I-squared	92.73	89.48	94.97	
Cochran's Q	178.73			
Chi2, p	0			
Q-Index	12.90			

Table S9. Meta-Analysis result for the effect of 0.1 unit NDVI increase on birthweight (excluding Agay-Shay et al (2018), Abelt et al(2017), Cusack et al(2016), Casey et al(2016)); β-standardized regression coefficient LCI- lower 95% confidence interval; UCI- upper 95% confidence interval; SE- standard error.

Year, Author	Exposure Type	Buffer Distance	Exposure description	IQR unit	estimate type	effect estimate calculated	LCI (OR)	UCI (OR)	QI	β	LCI (β)	UCI (β)	SE (β)
2019, Yin.	NDVI	250 m	IQR increase	0.1349	OR	0.99	0.95	1.04	0.72	-0.010	-0.051	0.040	0.021
2019, Laurent et al.	NDVI	500 m	IQR increase	0.119	OR	0.96	0.95	0.98	0.92	-0.038	-0.054	-0.022	0.009
2019, Dzhambov et al. (UIT)	NDVI	300 m	IQR increase	0.189	OR	0.43	0.23	0.81	0.72	-0.844	-1.470	-0.211	0.320
2019, Dzhambov et al. (BBT)	NDVI	300 m	IQR increase	0.148	OR	0.75	0.47	1.2	0.72	-0.288	-0.755	0.182	0.238
2019, Nieuwenhuijsen et al.	NDVI	300 m	IQR increase	0.175	OR	0.8	0.7	0.9	0.8	-0.223	-0.357	-0.105	0.068
2018, Agay Shay et al	NDVI	300 m	T3 vs T1	0.02698	OR	0.91	0.82	1.01	0.8	-0.094	-0.198	0.009	0.053

2018, Fong et al	NDVI	250 m	0.1 unit increase of mean NDVI	0.22	OR	0.98	0.97	0.99	0.8	-0.020	-0.030	-0.010	0.005
2017, Abelt, K., & McLaffert y	NDVI	250 m	mean NDVI	0.1349	OR	1.075	0.633	1.826	0.72	0.072	-0.458	0.602	0.270
2016, Ebisu et al.	green space (land use)	250 m	IQR increase in land use	0.38	OR	0.924	0.876	0.974	0.72	-0.079	-0.132	-0.026	0.027
2015, Grazulevic iene et al.	NDVI	300 m	IQR increase	0.09	OR	0.94	0.69	1.29	0.69	-0.062	-0.371	0.255	0.158
2014, Agay-Shay et al.	NDVI	250 m	IQR increase	0.0578	OR	0.85	0.81	0.89	0.8	-0.163	-0.211	-0.117	0.025

Table S10. Extracted data and effect size computations for meta-analysis on low birth weight; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval; QI- quality index; β-standardized regression coefficient; SE- standard error.

Study	β for 10% increase in green space proxies	LCI(β)	UCI(β)	10% OR	LCI(OR)	UCI(OR)
2019, Yin	-0.002	-0.010	0.006	0.998	0.990	1.006
2019, Laurent et al	-0.008	-0.011	-0.004	0.992	0.989	0.996
2019, Dzhambov et al. (UIT)	-0.169	-0.294	-0.044	0.845	0.745	0.96
2019, Dzhambov et al.(BBT)	-0.058	-0.151	0.036	0.94	0.86	1.04
2019, Nieuwenhuijsen et al.	-0.045	-0.071	-0.018	0.96	0.93	0.98
2018, Fong et al	-0.009	-0.013	-0.004	0.99	0.987	0.996
2016, Ebisu et al.	-0.016	-0.026	-0.005	0.98	0.974	0.995
2015, Grazuleviciene et al.	-0.012	-0.074	0.050	0.988	0.928	1.051
2014, Agay-Shay et al.	-0.033	-0.042	-0.023	0.968	0.959	0.977

Table S11. Effect size computations for meta-analysis on low birth weight based on 10% increase in green space proxies(NDVI and green space percentage); β-standardized regression coefficient LCI- lower 95% confidence interval; UCI- upper 95% confidence interval; OR- odds ratio

Study	OR	LCI 95%	HCI 95%	weight (%)
2019, Yin	1.00	0.99	1.01	7.40
2019, Laurent et al	0.99	0.99	1.00	52.16
2019, Dzhambov et al. (UIT)	0.84	0.75	0.96	0.82
2019, Dzhambov et al.(BBT)	0.94	0.86	1.04	0.84
2019, Nieuwenhuijsen et al.	0.96	0.93	0.98	1.58

2018, Fong et al	0.99	0.99	1.00	25.34
2016, Ebisu Et al.	0.98	0.97	0.99	4.74
2015, Grazuleviciene Et al.	0.99	0.93	1.05	0.87
2014, Agay-Shay Et al.	0.97	0.96	0.98	6.25
Pooled	0.99	0.98	1.00	100.00
Statistics				
I-squared	80.77	64.40	89.61	
Cochran's Q	41.59			
Chi2, p	0.00			
Q-Index	7.57			

Table S12. Meta-analysis result for the effect of 10% increase in green space proxies (NDVI and green space percentage) on low birth weight; OR- odds ratio; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval

Study	**β for 0.1 unit increase in NDVI**	**LCI(β)**	**UCI(β)**	**10% OR**	**LCI(OR)**	**UCI(OR)**
2019, Yin	-0.007	-0.038	0.023	0.993	0.963	1.023
2019, Laurent et al	-0.032	-0.046	-0.018	0.969	0.955	0.983
2019, Dzhambov et al. (UIT)	-0.447	-0.778	-0.116	0.640	0.460	0.891
2019, Dzhambov et al.(BBT)	-0.194	-0.509	0.121	0.824	0.601	1.129
2019, Nieuwenhuijsen et al.	-0.128	-0.204	-0.051	0.88	0.82	0.95
2018, Fong et al	-0.02	-0.013	-0.004	0.98	0.986	0.996
2015, Grazuleviciene et al.	-0.069	-0.41	0.27	0.93	0.66	1
2014, Agay-Shay et al.	-0.281	-0.365	-0.198	0.755	0.69	0.821

Table S13. Effect size computations for meta-analysis on low birth weight based on 0.1 unit increase in NDVI;β-standardized regression coefficient; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval; OR- odds ratio

Study	**OR**	**LCI 95%**	**HCI 95%**	**weight (%)**
2019, Yin	0.99	0.96	1.02	2.91
2019, Laurent et al	0.97	0.96	0.98	10.89
2019, Dzhambov et al. (UIT)	0.64	0.46	0.89	1.42
2019, Dzhambov et al.(BBT)	0.82	0.60	1.13	1.42
2019, Nieuwenhuijsen et al.	0.88	0.82	0.95	1.83
2018, Fong et al	0.98	0.99	1.00	78.37
2015, Grazuleviciene Et al.	0.93	0.66	1.00	1.38
2014, Agay-Shay Et al.	0.75	0.69	0.82	1.79
Pooled	0.96	0.92	1.01	100
Statistics				
I-squared	87.36	77.30	92.97	
Cochran's Q	55.40			
Chi2, p	0.00			
Q-Index	12.03			

Table S14. Meta-analysis result for the effect of 0.1 unit increase in NDVI on low birth weight; OR- odds ratio; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval

Year, Author	Exposure Type	Buffer	Exposure description	IQR unit	Esti-mate type	Effect estimate calculated	LCI (OR)	UCI (OR)	QI	β	LCI (β)	UCI (β)	SE(β)
2019, Dzhambov et al. UIT	NDVI	300 m	IQR increase	0.189	OR	0.41	0.21	0.81	0.72	-0.892	-1.561	-0.211	0.341
2019, Dzhambov et al. BBT	NDVI	300 m	IQR increase	0.148	OR	0.78	0.5	1.2	0.72	-0.248	-0.693	0.182	0.227
2019, Donovan et al.	NDVI	240 m	IQR increase	0.090	OR	0.94	0.9	1	0.72	-0.062	-0.105	0	0.022
2019, Eriksson et al.	NDVI	500 m	IQR increase	0.167	OR	0.31	0.1	1	0.72	-1.171	-2.303	0	0.577
2018, Agay Shay et al.	NDVI	300 m	T3 vs T1	0.02698	OR	0.95	0.87	1.03	0.99	-0.051	-0.139	0.030	0.045
2018, Fog C. et al.	NDVI	250 m	0.1 unit increase of mean NDVI, Q4 vs. Q1	0.22	OR	0.98	0.97	0.99	0.8	-0.020	-0.030	-0.010	0.005
2018, Glazer et al.	NDVI	250 m	IQR increase, SD:0.15	0.20235	OR	0.99	0.9	1.1	0.8	-0.010	-0.105	0.095	0.049
2017, Abelt et al.	NDVI	250 m	mean NDVI, street tree count	0.1349	OR	1.17	0.885	1.538	0.72	0.154	-0.122	0.430	0.141

2015, Grazulevicienet al.	NDVI	300 m	IQR increase	0.09	OR	0.93	0.81	1.08	0.69	-0.073	-0.211	0.077	0.070
2016, Cusack et al.	NDVI	250 m	Quantiles	IQR =0.15	OR	0.99	0.97	1	1	-0.010	-0.030	0	0.010
2016, Ebisu et al.	green space (land use)	250 m	IQR increase	NA	OR	0.974	0.949	0.99	0.72	-0.026	-0.052	-0.010	0.0133
2016, Casey et al.	NDVI	250 m	NDVI tertiles	Tertile cut off point: 0.43	OR	0.73	0.58	0.97	0.83	-0.315	-0.545	-0.030	0.117
2014, Hystad et al.	NDVI	100 m and 250m were highly correlated	IQR increase	0.1	OR	0.97	0.94	1	0.92	-0.030	-0.062	0	0.016
2011, Dadvand et al.	NDVI	100 m	10% increase	0.008	OR	0.99	0.981	0.999	0.72	-0.010	-0.019	-0.0007	0.0047
2010, Donovan et al.	Tree cover	50m, 100m, 200m	10% increase	NA	OR	0.847	0.761	0.942	0.72	-0.167	-0.273	-0.060	0.054

Table S15. Extracted data and effect size computations for meta-analysis on small for gestational age; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval; OR- odds ratio; QI- quality index; β-standardized regression coefficient; SE- standard error.

Year, Author	10% Increase in residential greenness (β)	LCI(β)	UCI(β)	10% OR	LCI (OR)	UCI(OR)
2019, Dzhambov et al. (UIT)	-0.393	-0.688	-0.390	0.675	0.503	0.677
2019, Dzhambov et al. (BBT)	-0.109	-0.305	-0.107	0.896	0.737	0.898
2019, Donovan et al.	-0.027	-0.046	-0.027	0.973	0.955	0.973
2019, Eriksson et al.	-0.516	-1.014	-0.511	0.597	0.363	0.600
2018, Fong C. et al	-0.009	-0.013	-0.009	0.991	0.987	0.991
2018, Glazer et al.	-0.002	-0.021	0.017	0.998	0.980	1.017
2015, Grazuleviciene	-0.015	-0.042	0.013	0.986	0.959	1.013
2016, Ebisu et al	-0.005	-0.010	-0.00007	0.995	0.990	1.000
2014, Hystad et al.	-0.006	-0.012	0.0002	0.994	0.988	1.000
2011, Dadvand et al.	-0.010	-0.019	-0.0007	0.990	0.981	0.999
2010, Donovan et al.	-0.167	-0.273	-0.060	0.847	0.761	0.942

Table S16. Effect size computations for meta-analysis on small for gestational age based on 10% increase in green space proxies (NDVI and green space percentage) β-standardized regression coefficient; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval; OR- odds ratio

Study	OR	LCI	UCI	weight (%)
2019, Dzhambov et al. (UIT)	0.68	0.50	0.68	1.21
2019, Dzhambov et al. (BBT)	0.90	0.74	0.90	1.23
2019, Donovan et al.	0.97	0.95	0.97	4.18
2019, Eriksson et al.	0.60	0.36	0.60	1.21
2018, Fong C. et al	0.99	0.99	0.99	60.73

2018, Glazer et al	1.00	0.98	1.02	2.19
2015, Grazuleviciene et al.	0.99	0.96	1.01	1.50
2016, Ebisu et al.	0.99	0.99	1.00	11.49
2014, Hystad et al.	0.99	0.99	1.00	10.54
2011, Dadvand et al.	0.99	0.98	1.00	4.50
2010, Donovan et al.	0.85	0.76	0.94	1.23
Pooled	0.98	0.96	0.99	100.00
Statistics				
I-squared	85.85	76.46	91.49	
Cochran's Q	70.68			
Chi2, p	0.00			
Q-Index	13.77			

Table S17. Meta-analysis results for the effect of 10% increase in green space proxies (NDVI and green space percentage) on small for gestational age; OR- odds ratio; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval

Year, Author	**0.1 unit increase in NDVI (β)**	**LCI (β)**	**UCI (β)**	**0.1 OR**	**LCI (OR)**	**UCI (OR)**
2019, Dzhambov et al. (UIT)	-0.892	-1.561	-0.211	0.410	0.210	0.810
2019, Dzhambov et al. (BBT)	-0.248	-0.693	0.182	0.780	0.500	1.200
2019, Donovan et al.	-0.062	-0.105	0.000	0.940	0.900	1.000
2019, Eriksson et al.	-1.171	-2.303	0.000	0.310	0.100	1.000
2018, Fong C. et al	-0.020	-0.030	-0.010	0.98	0.97	0.99
2018, Glazer et al	-0.005	-0.052	0.042	0.995	0.949	1.043
2015, Grazuleviciene et al.	-0.081	-0.234	0.073	0.923	0.791	1.076
2014, Hystad et al.	-0.030	-0.062	0	0.97	0.94	1

2011, Dadvand et al.	-0.123	-0.239	-0.008	0.884	0.788	0.992

Table S18. Effect size computations for meta-analysis on small for gestational age based on 0.1 unit increase in NDVI; β-standardized regression coefficient; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval; OR- odds ratio

Study	**OR**	**LCI**	**UCI**	**weight (%)**
2019, Dzhambov et al. (UIT)	0.41	0.21	0.81	1.31
2019, Dzhambov et al. (BBT)	0.78	0.50	1.20	1.33
2019, Donovan et al.	0.94	0.90	1.00	3.73
2019, Eriksson et al.	0.31	0.10	1.00	1.30
2018, Fong C. et al	0.98	0.97	0.99	73.52
2018, Glazer et al	1.00	0.95	1.04	4.82
2015, Grazuleviciene	0.92	0.79	1.08	1.52
2014, Hystad	0.97	0.94	1.00	10.67
2011, Dadvand	0.88	0.79	0.99	1.80
Pooled	0.95	0.91	0.99	100.00
Statistics				
I-squared	55.06	4.98	78.74	
Cochran's Q	17.80			
Chi2, p	0.02			
Q-Index	12.24			

Table S19. Meta-analysis result for the effect of 0.1 unit increase in NDVI on small for gestational age; OR- odds ratio; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval

Year, Author	Exposure Type	Buffer	Exposure description	IQR unit	estimate type	effect estimate calculated	LCI (OR)	UCI (OR)	QI	β	LCI(β)	UCI(β)	SE(β)
2019, Dzhambov et al. UIT	NDVI	300	IQR increase	0.189	OR	0.78	0.53	1.13	0.720	-0.248	-0.635	0.122	0.197
2019, Dzhambov et al. BBT	NDVI	300	IQR increase	0.148	OR	1.31	0.91	1.88	0.720	0.270	-0.094	0.631	0.186
2018, Agay Shay et al.	NDVI	300 m	T3 vs T1	0.02698	OR	0.95	0.87	1.03	0.99	-0.051	-0.139	0.030	0.045
2018, Glazer et al et al.	NDVI	250 m	IQR increase, SD:0.15	0.20235	OR	0.99	0.9	1.09	0.8	-0.010	-0.105	0.086	0.049
2017, Abelt et al.	NDVI	250 m	mean NDVI	0.1349	OR	0.841	0.638	1.108	0.72	-0.174	-0.450	0.102	0.141
2015, Grazulevi ciene et al.	NDVI	300 m	Per IQR increase	0.09	OR	1.06	0.89	1.25	0.69	0.058	-0.117	0.223	0.089
2014, Agay-Shay et al.	NDVI	250 m	IQR increase	0.0578	OR	1.01	0.97	1.05	0.8	0.010	-0.030	0.049	0.021
2016, Cusack et al.	NDVI	250m	Quantiles	IQR= 0.15	OR	1.01	0.99	1.02	1	0.010	-0.010	0.020	0.010

2016, Casey et al.	NDVI	250 m	tertiles	tertile cut off point: 0.43	OR	0.78	0.61	0.99	0.83	-0.249	-0.494	-0.010	0.125
2014, Hystad et al.	NDVI	**100 m** and 250m were highly correlated	IQR increase	0.1	OR	0.95	0.91	0.99	0.92	-0.051	-0.094	-0.010	0.022
2013, Laurent et al.	NDVI	150 m	IQR increase	0.131	OR	0.984	0.967	1	0.8	-0.016	-0.034	0	0.009

Table S20. Extracted data and effect size computations for meta-analysis on preterm birth LCI- lower 95% confidence interval; UCI- upper 95% confidence interval; OR- odds ratio; QI- quality index; β-standardized regression coefficient; SE- standard error.

Year, Author	10% increase in residential greenness (β)	LCI(β)	UCI(β)	10% OR	LCI(OR)	UCI(OR)
2019, Dzhambov et al. UIT	-0.050	-0.127	0.028	0.952	0.881	1.028
2019, Dzhambov et al. BBT	0.054	-0.019	0.127	1.055	0.981	1.135
2018, Glazer et al.	-0.002	-0.021	0.017	0.998	0.979	1.017
2015, Grazuleviciene et al.	0.012	-0.023	0.047	1.012	0.977	1.048
2014, Agay-Shay et al.	0.002	-0.006	0.010	1.002	0.994	1.010
2014, Hystad et al.	-0.010	-0.019	-0.002	0.990	0.981	0.998
2013, Laurent et al.	-0.003	-0.007	0.00026	0.997	0.993	1.000

Table S21. Effect size computations for meta-analysis on preterm birth based on 10% increase in green space proxies (NDVI and green space percentage) β-standardized regression coefficient; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval; OR- odds ratio.

Study	OR	LCI	UCI	weight (%)
2019, Dzhambov et al. UIT	0.95	0.88	1.03	1.65
2019, Dzhambov et al. BBT	1.06	0.98	1.14	1.66
2018, Glazer et al	1.00	0.98	1.02	3.79
2015, Grazuleviciene	1.01	0.98	1.05	2.00
2014, Agay-Shay	1.00	0.99	1.01	13.28
2014, Hystad	0.99	0.98	1.00	13.70
2013, Laurent	1.00	0.99	1.00	63.92
Pooled	1.00	0.99	1.00	100.00
Statistics				
I-squared	30.53	0.00	70.32	
Cochran's Q	8.64			
Chi2, p	0.20			

Q-Index	11.62			

Table S22. Meta-analysis result for the effect of 10% increase in residential greenness (NDVI and green space percentage) on preterm birth; OR- odds ratio; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval.

Year, Author	**0.1 unit increase in NDVI (β)**	**LCI(β)**	**UCI(β)**	**0.1 OR**	**LCI(OR)**	**UCI(OR)**
2019, Dzhambov et al. UIT	-0.132	-0.336	0.073	0.877	0.715	1.076
2019, Dzhambov et al. BBT	0.182	-0.064	0.427	1.200	0.938	1.533
2018, Glazer et al.	-0.005	-0.052	0.042	0.995	0.949	1.043
2015, Grazuleviciene et al.	0.065	-0.129	0.259	1.067	0.879	1.296
2014, Agay-Shay et al.	0.017	-0.053	0.087	1.017	0.949	1.091
2014, Hystad et al.	-0.051	-0.094	-0.010	0.95	0.91	0.99
2013, Laurent et al.	-0.012	-0.026	0.001	0.988	0.975	1.001

Table S23. Effect size computations for meta-analysis on preterm birth based on 0.1 unit increase in NDVI; OR- odds ratio; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval.

Study	**OR**	**LCI 95%**	**HCI 95%**	**weight (%)**
2018, Glazer et al	0.995	0.950	1.043	8.083
2015, Grazuleviciene	1.067	0.879	1.296	2.357
2014, Agay-Shay	1.017	0.949	1.091	4.979
2014, Hystad	0.95	0.91	0.99	10.929
2013, Laurent	0.988	0.975	1.001	73.652
Pooled	0.987	0.970	1.005	100

Statistics				
I-squared	13.226	0	81.954	
Cochran's Q	4.610			
Chi2, p	0.30			
Q-Index	12.024			

Table S24. Meta-analysis results of the effect of 0.1 unit increase in NDVI on preterm birth; OR- odds ratio; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval.

Study	**ES**	**LCI 95%**	**HCI 95%**	**weight (%)**
2018, Agay Shay et al.	0.0011	0.0006	0.0016	11.66
2018, Cusack et al	0.0028	-0.0026	0.0082	1.32
2018, Fog C. et al	0.0005	0.0003	0.0007	52.36
2018, Glazer et al.	0.0021	-0.0001	0.0042	1.69
2017, Cusack et al. Portland	-0.0008	-0.0020	0.0004	2.67
2017, Cusack et al. Austin	0.0004	-0.0010	0.0017	2.37
2017, Abelt	0.0019	0.0000	0.0038	1.63
2016, Cusack	0.0004	0.0000	0.0008	17.53
2016, Casey	0.0043	-0.0001	0.0088	1.40
2014, Hystad	0.0035	0.0028	0.0042	6.23
2012, Dadvand	0.0085	0.0004	0.0166	1.15
Pooled	0.0009	-0.0002	0.0020	100
Statistics				
I-squared	88.36246	81.15955	92.81162	
Cochran's Q	85.92882			
Chi2, p	0.0000			
Q-Index	14.29291			

Table S25. Meta-Analysis Results for the effect of NDVI increase on term birth weight (standardized regression coefficients, quality effects model) ; β-standardized regression coefficient; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval.

Study	ES	LCI 95%	HCI 95%	weight (%)
2019, Nieuwenhuijsen et al.	0.0056	0.0041	0.0071	4.45
2018, Agay Shay et al.	0.0011	0.0006	0.0016	36.64
2015, Grazuleviciene	0.0014	-0.0009	0.0037	2.56
2014, Agay-Shay	0.0018	0.0012	0.0023	24.75
2014, Dadvand (in)B	0.0037	0.0004	0.0070	2.28
2013, Markevych	0.0039	0.0002	0.0076	2.15
2013, Laurent	0.0001	-0.0004	0.0007	24.75
2011, Dadvand	-0.0011	-0.0037	0.0015	2.41
Pooled	0.0013	0.0000	0.0026	100.00
Statistics				
I-squared	88.4163	79.4791	93.4612	
Cochran's Q	60.42997			
Chi2, p	0.0000			
Q-Index	13.02925			

Table S26. Meta-Analysis Results for the effect of NDVI increase on birth weight that are adjusted for gestational age (standardized regression coefficients, quality effects model) ; β-standardized regression coefficient; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval.

Study	ES	LCI 95%	HCI 95%	weight (%)
2019, Nieuwenhuijsen et al.	0.8	0.7	0.9	0.63
2018, Fong et al	0.98	0.97	0.99	94.88
2017, Abelt, K., & McLafferty	1.08	0.63	1.83	0.03
2014, Agay-Shay Et al.	0.85	0.81	0.89	4.46
Pooled	0.97	0.80	1.18	100
Statistics				
I-squared	93.02	85.35	96.68	
Cochran's Q	42.99			
Chi2, p	0.00			
Q-Index	0.00			

Table S27. Meta-Analysis Results for the effect of NDVI increase on term low birth weight (standardized regression coefficients, quality effects model) ; β-standardized regression coefficient; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval.

Study	ES	LCI 95%	HCI 95%	weight (%)
2018, Agay Shay et al	0.91	0.82	1.01	23.12

2015, Grazuleviciene Et al.	0.94	0.69	1.29	5.80
2014, Agay-Shay Et al.	0.85	0.81	0.89	71.09
Pooled	0.87	0.83	0.91	100.00
Statistics				
I-squared	0.00	0.00	87.56	
Cochran's Q	1.67			
Chi2, p	0.43			
Q-Index	16.20			

Table S28. Meta-Analysis Results for the effect of NDVI increase on low birth weight that are adjusted for gestational age (standardized regression coefficients, quality effects model) ; β-standardized regression coefficient; LCI- lower 95% confidence interval; UCI- upper 95% confidence interval.

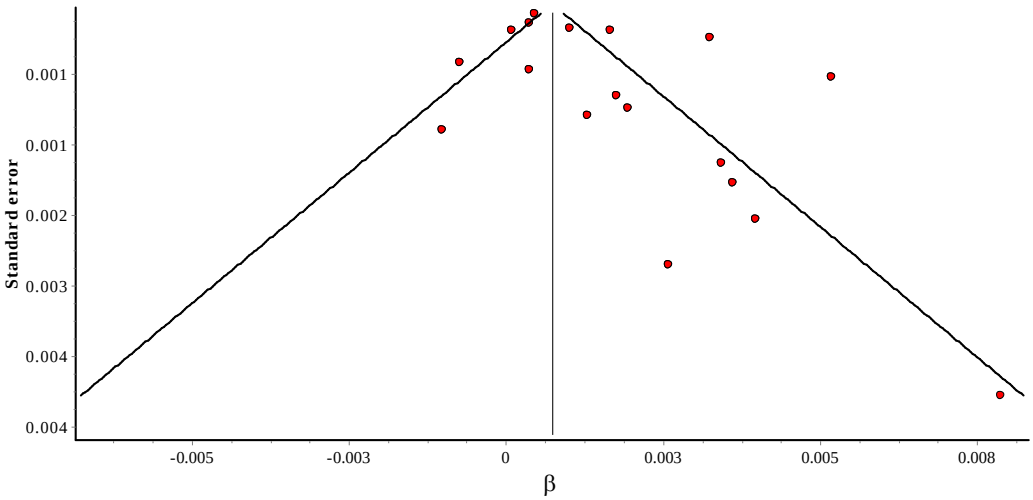

Figure S3. Funnel plot on the studies evaluating the effect of residential greenness (NDVI) on birthweight (standardized regression coefficients, quality effects model).

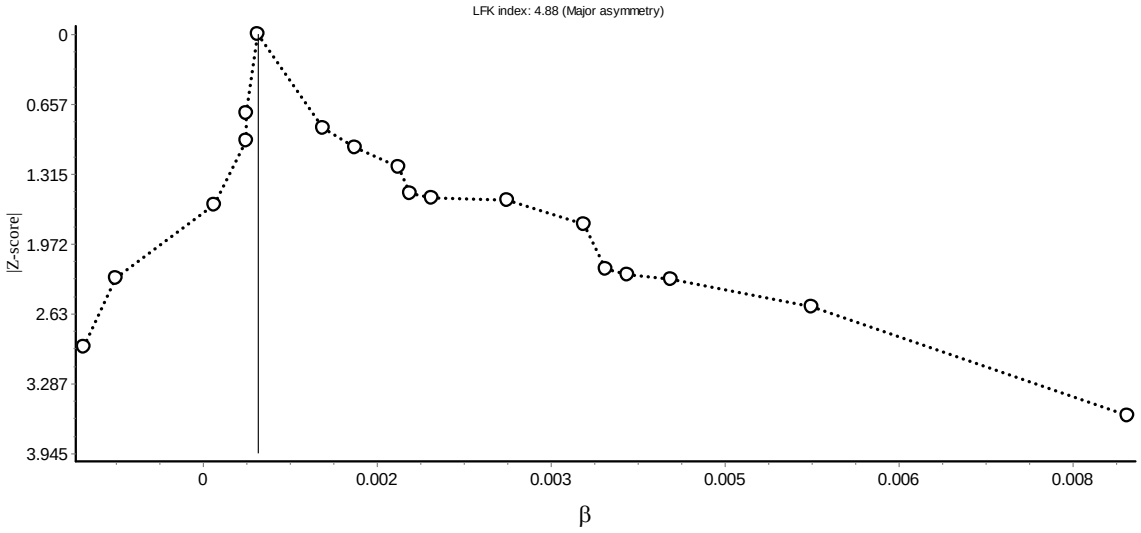

Figure S4. Doi plot on the studies evaluating the effect of residential greenness (NDVI) on birthweight (standardized regression coefficients, quality effects model).

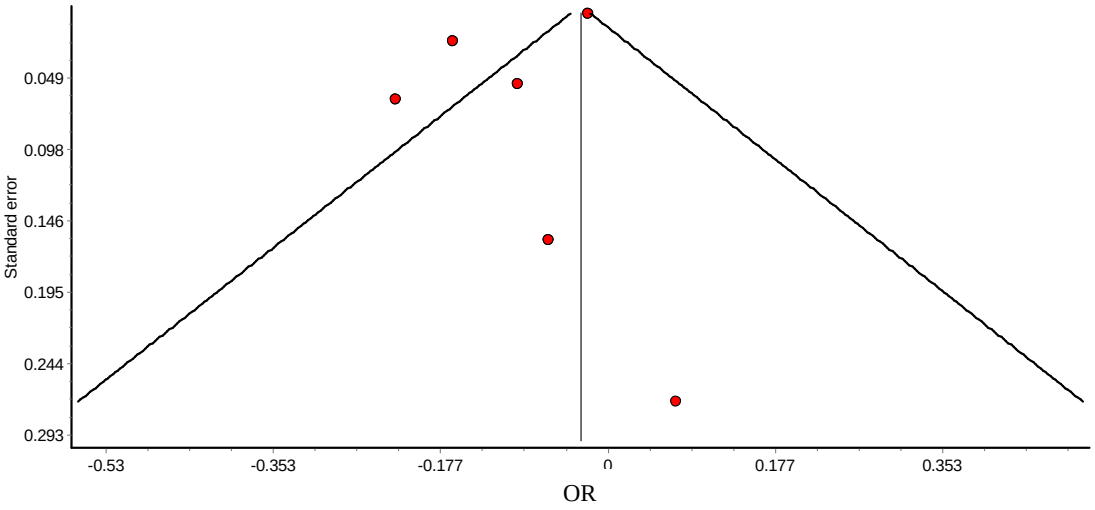

Figure S5. Funnel plot on the effect of residential greenness (NDVI) on low birth weight (odds ratio, quality effects model).

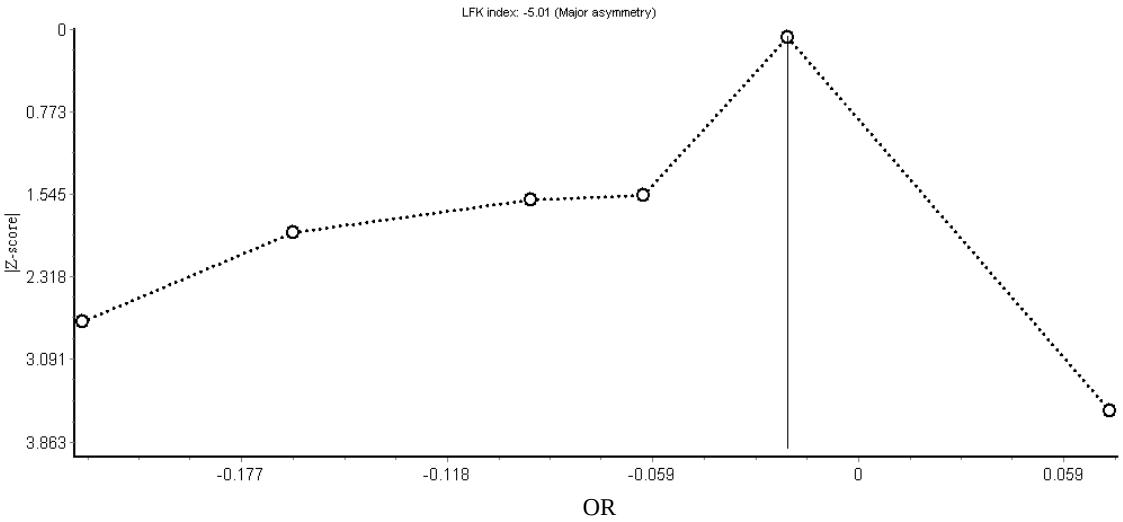

Figure S6. Doi plot on the studies evaluating the effect of residential greenness (NDVI) on low birth weight (odds ratio, quality effects model).

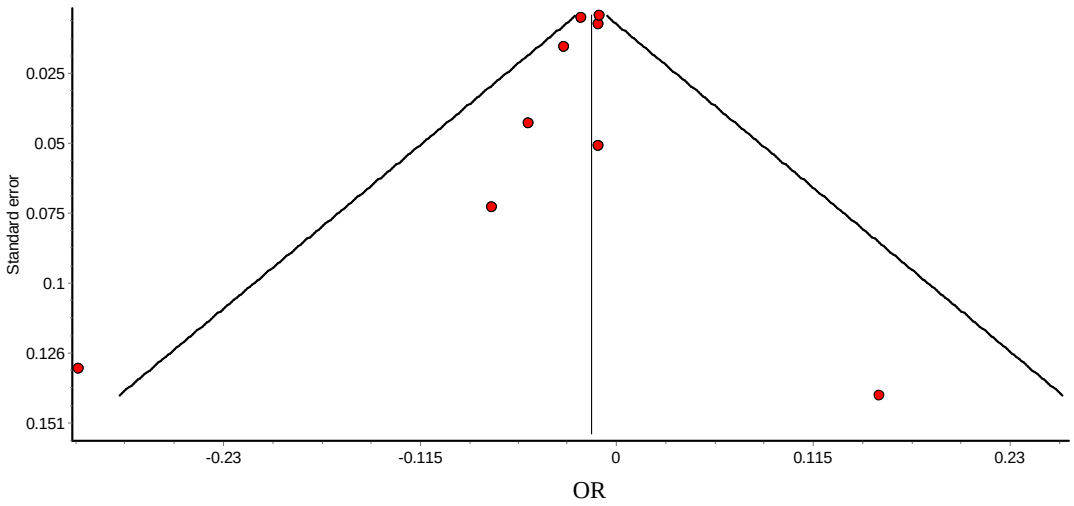

Figure S7. Funnel plot on the effect of residential greenness (NDVI) on small for gestational age (odds ratio, quality effects model).

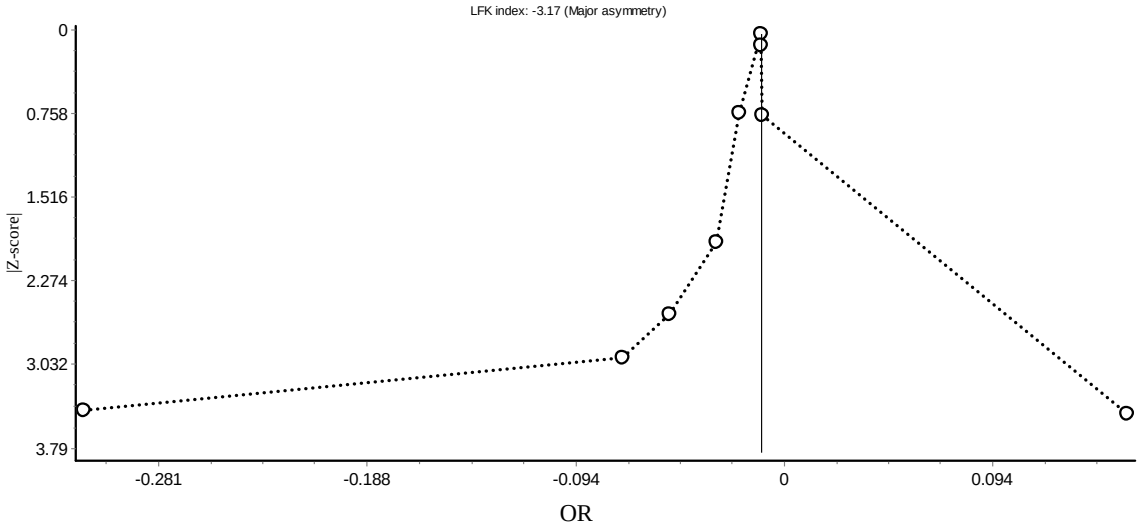

Figure S8. Doi plot on the effect of residential greenness (NDVI) on small for gestational age (odds ratio, quality effects model).

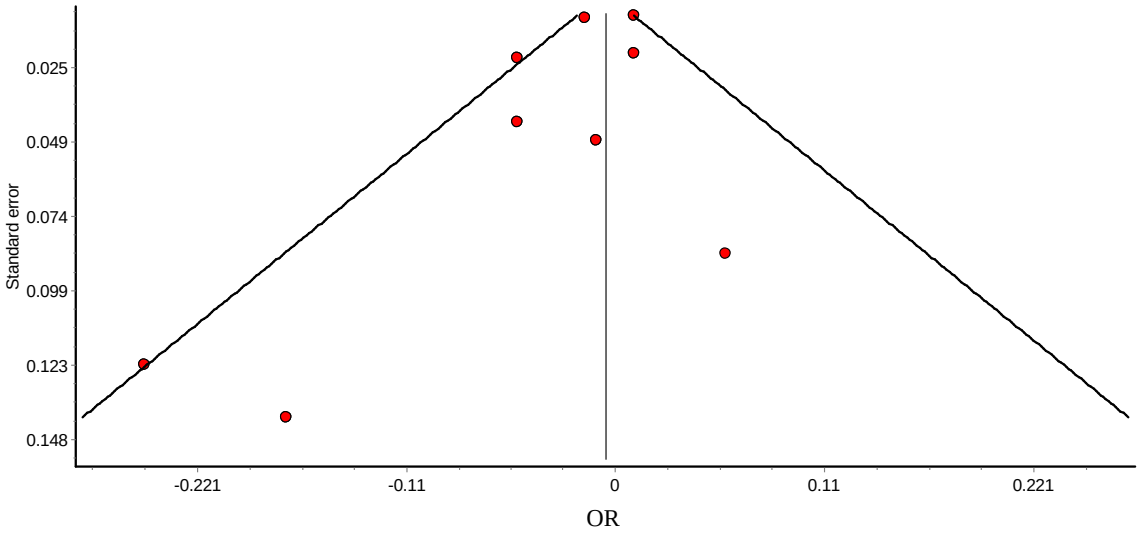

Figure S9. Funnel plot on the effect of residential greenness (NDVI) on preterm birth (odds ratio, quality effects model).

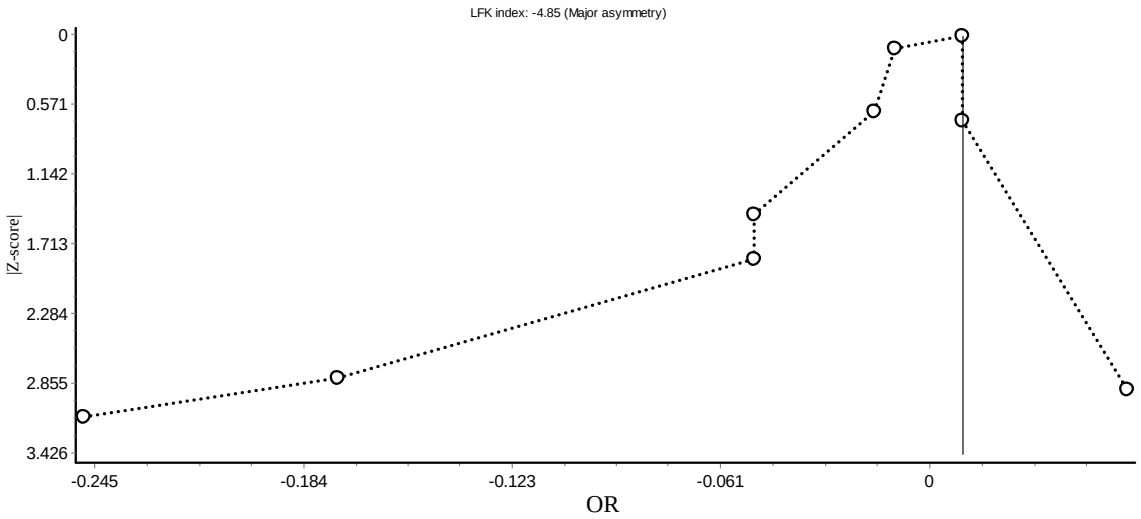

Figure S10. Doi plot on the effect of residential greenness (NDVI) on preterm birth (odds ratio, quality effects model).