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Supplemental Material

The Association between Residential Green Space in Childhood and Development of Attention Deficit Hyperactivity Disorder: A Population-Based Cohort Study

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Table of Contents

Figure S1. Definition of study population

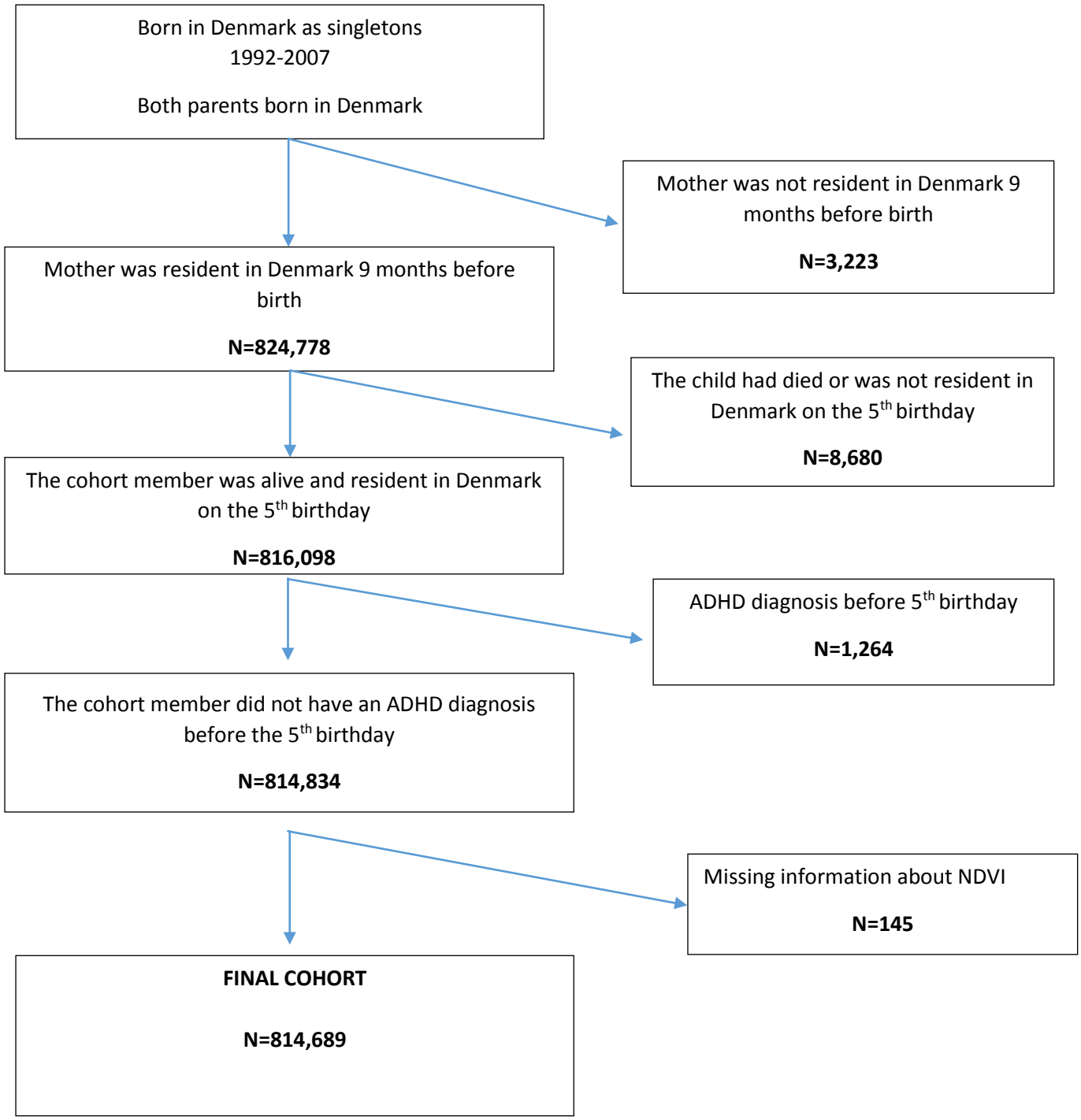

Table S1: IRRs for ADHD by NDVI within the first five years of life and stratified by year of birth, sex, region, urbanicity, parental SES and neighborhood level SES (with interaction term)

	Base adjustment model[ᵀ] IRR (95% CI)	Adjusted model [β] IRR (95% CI)
Birth year group		
1992-1996	1.58 (1.47, 1.70)	1.26 (1.17, 1.36)
1997-2001	1.35 (1.26, 1.43)	1.12 (1.05, 1.19)
2002-2007	1.37 (1.25, 1.49)	1.10 (1.01, 1.20)
P-value	(p = 0.00093)	(p=0.01820)
Sex		
Female	1.62 (1.52, 1.74)	1.34 (1.25, 1.44)
Male	1.28 (1.22, 1.34)	1.05 (1.00, 1.11)
P-value	(p=<0.00001)	(p=<0.00001)
Region		
North Denmark	1.68 (1.43, 1.98)	1.43 (1.21, 1.69)
Central Denmark	1.54 (1.43, 1.66)	1.30 (1.20, 1.40)
South Denmark	1.50 (1.37, 1.64)	1.26 (1.15, 1.38)
Capital Region	1.35 (1.25, 1.47)	1.01 (0.93, 1.10)
Zealand	1.14(1.03, 1.27)	0.93 (0.83, 1.04)
P-value	(p =0.00002)	(p=<0.00001)
Mother's level of education[ǂ]		
Primary school	1.29 (1.21, 1.38)	1.30 (1.21, 1.38)
Short education	1.27 (1.20, 1.35)	1.28 (1.20, 1.36)
Medium long education	1.20 (1.09, 1.33)	1.20 (1.08, 1.33)
Long education	0.97 (0.77, 1.22)	0.95 (0.76, 1.20)
P-value	(p =0.08654)	(p =0.05562)

Table S1 (Continued): IRRs for ADHD by NDVI within the first five years of life and stratified by year of birth, sex, region, urbanicity, parental SES and neighborhood level SES (with interaction term)

	Base adjustment model[ᵀ] IRR (95% CI)	Adjusted model [β] IRR (95% CI)
Father's level of education[ǂ]		
Primary school	1.32 (1.24, 1.41)	1.32 (1.24, 1.41)
Short education	1.35 (1.27, 1.42)	1.35 (1.27, 1.43)
Medium long education	1.09 (0.94, 1.25)	1.09 (0.95, 1.26)
Long education	1.11 (0.91, 1.34)	1.11 (0.92, 1.35)
P-value	(p =0.01203)	(p =0.01640)
Mother's level of income[§]		
Below the 20th percentile	2.12 (1.69, 2.66)	2.05 (1.63, 2.59)
20th to the 40th percentile	1.04 (0.95, 1.15)	1.03 (0.93, 1.14)
40th to the 60th percentile	1.44 (1.36, 1.53)	1.44 (1.36, 1.53)
60th to the 80th percentile	1.29 (1.20, 1.39)	1.30 (1.21, 1.40)
Above the 80th percentile	1.09 (0.95, 1.27)	1.10 (0.95, 1.27)
P-value	(p=<0.00001)	(p=<0.00001)
Father's level of income[§]		
Below the 20th percentile	1.30 (1.00, 1.70)	1.54 (1.16, 2.04)
20th to the 40th percentile	1.01 (0.89, 1.16)	1.21 (1.05, 1.39)
40th to the 60th percentile	1.16 (1.07, 1.27)	1.32 (1.21, 1.45)
60th to the 80th percentile	1.39 (1.31, 1.48)	1.52 (1.43, 1.62)
Above the 80th percentile	1.20 (1.13, 1.28)	1.34 (1.26, 1.43)
P-value	(p =0.00002)	(p =0.00233)

Table S1 (Continued): IRRs for ADHD by NDVI within the first five years of life and stratified by year of birth, sex, region, urbanicity, parental SES and neighborhood level SES (with interaction term)

	Base adjustment model[ɤ] IRR (95% CI)	Adjusted model[β] IRR (95% CI)
Neighborhood level of income in municipality		
Low income municipality	1.43 (1.33, 1.53)	1.18 (1.10, 1.27)
Medium income municipality	1.54 (1.43, 1.65)	1.27 (1.18, 1.36)
High income municipality	1.33 (1.24, 1.43)	1.05 (0.98, 1.13)
P-value	(p=0.01060)	(p=0.00062)
Neighborhood level of education		
Low education municipality	1.51 (1.42, 1.62)	1.28 (1.20, 1.38)
Medium education municipality	1.45 (1.34, 1.56)	1.15 (1.06, 1.24)
High education municipality	1.29 (1.19, 1.39)	1.02 (0.95, 1.11)
P-value	(p=0.00462)	(p=0.00006)
Neigborhood level of unemployment		
High uemployment municipality	1.54 (1.43, 1.65)	1.20 (1.12, 1.29)
Medium unemployment municipality	1.43 (1.34, 1.53)	1.18 (1.10, 1.26)
Low unemployment municipality	1.32 (1.23, 1.42)	1.10 (1.03, 1.19)
P-value	(p=0.00986)	(p =0.22444)

Table S1 (Continued): IRRs for ADHD by NDVI within the first five years of life and stratified by year of birth, sex, region, urbanicity, parental SES and neighborhood level SES (with interaction term)

	Base adjustment model[ᵀ] IRR (95% CI)	Adjusted model[β] IRR (95% CI)
Urbanicity		
Capital	1.51 (1.32, 1.73)	1.07 (0.93, 1.23)
Capital suburb	1.31 (1.17, 1.47)	1.00 (0.89, 1.12)
Municipalities with a town with > 100,000 inhabitants	1.37 (1.20, 1.57)	1.19 (1.04, 1.36)
Municipalities with a town with 10,000 – 100,000 inhabitants	1.43 (1.32, 1.54)	1.14 (1.06, 1.24)
Other municipalities (largest town < 10,000 inhabitants)	1.46 (1.37, 1.57)	1.25 (1.17, 1.34)
P-value	(p =0.38813)	(p=0.01371)

Abbreviations: NDVI; Normalized Difference Vegetation Index. IRR; Incidence rate ratio.

[ᵀ]Multilevel modeling was used to estimate the association between NDVI in numeric deciles measured at 210 × 210 m around an individual's residential address between age 0 to 5 years and the outcome of ADHD in a cohort of 814 689 individuals born in Denmark 1992 to 2007 and who were followed from 1997 until 2017 and adjusted for age, calendar year, sex

[β] Multilevel modeling was used to estimate the association between NDVI in numeric deciles measured at 210 × 210 m around an individual's residential address between age 0 to 5 years and the outcome of ADHD in a cohort of 814 689 individuals born in Denmark 1992 to 2007 and who were followed from 1997 until 2017 and adjusted for age, calendar year, sex, mother's and father's level of education and income, urbanicity and proportion of low income, low education and unemployment at municipal level

Table S2: IRRs for ADHD by NDVI within different proximities around residential address

NDVI within quadrat size	IRR (95% CI)
210 X 210 m (7 X 7 cells)	1.16 (1.11, 1.22)
330 X 330 m (11 X 11 cells)	1.16 (1.11, 1.22)
570 X 570 m (19 X 19 cells)	1.15 (1.10, 1.21)
930 X 930 m (31 X 31 cells)	1.13 (1.08, 1.19)

Abbreviations: NDVI; Normalized Difference Vegetation Index. IRR; Incidence rate ratio.
Quadrat size is the different exposure zones of green space around the residential address. Multilevel modeling was used to estimate the association between NDVI in numeric deciles and ADHD
All estimates were adjusted for age, calendar year, sex, mother's and father's level of education and income, urbanicity and proportion of low income, low education and unemployment at municipal level

Table S3: Incidence rate ratios (IRRs) for ADHD by NDVI at different ages within an exposure zone of 210 × 210 m

NDVI deciles	Age 1 IRR (95% CI)	Age 2 IRR (95% CI)	Age 3 IRR (95% CI)	Age 4 IRR (95% CI)	Age 5 IRR (95% CI)
1	1.10 (1.04, 1.17)	1.08 (1.02, 1.15)	1.08 (1.02, 1.14)	1.10 (1.05, 1.17)	1.16 (1.09, 1.22)
2	1.09 (1.04, 1.16)	1.07 (1.01, 1.13)	1.09 (1.03, 1.15)	1.10 (1.05, 1.17)	1.14 (1.08, 1.20)
3	1.09 (1.04, 1.15)	1.09 (1.03, 1.15)	1.08 (1.02, 1.14)	1.08 (1.02, 1.14)	1.08 (1.03, 1.14)
4	1.05 (1.00, 1.11)	1.08 (1.02, 1.14)	1.07 (1.01, 1.13)	1.10 (1.05, 1.16)	1.12 (1.06, 1.18)
5	1.07 (1.01, 1.13)	1.09 (1.03, 1.15)	1.04 (0.98, 1.09)	1.03 (0.98, 1.09)	1.08 (1.02, 1.14)
6	1.03 (0.98, 1.09)	1.05 (1.00, 1.11)	1.02 (0.96, 1.07)	1.02 (0.97, 1.08)	1.05 (0.99, 1.11)
7	1.08 (1.02, 1.14)	0.98 (0.93, 1.04)	1.02 (0.97, 1.08)	1.02 (0.96, 1.07)	1.06 (1.01, 1.12)
8	1.06 (1.00, 1.12)	1.03 (0.98, 1.09)	1.01 (0.96, 1.07)	1.03 (0.98, 1.08)	1.12 (1.06, 1.18)
9	1.06 (1.01, 1.12)	1.05 (0.99, 1.10)	0.98 (0.93, 1.03)	1.04 (0.98, 1.09)	1.08 (1.03, 1.14)
10	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)

Abbreviations: IRR; Incidence rate ratio. NDVI; Normalized Difference Vegetation Index.

Multilevel modeling was used to estimate the association between NDVI in deciles measured at 210 × 210 m around an individual's residential address between age 0 to 5 years and the outcome of ADHD in a cohort of 814 689 individuals born in Denmark 1992 to 2007 and who were followed from 1997 until 2017.

All models were adjusted for age, calendar year, sex and mother's and father's level of education and income, urbanicity and proportion of low income, low education and unemployment at municipal level

Table S4: IRRs for ADHD by NDVI among firstborn children

NDVI	IRR (95% CI)
High vs Low	1.10 (1.03, 1.17)

Abbreviations: NDVI; Normalized Difference Vegetation Index. IRR; Incidence rate ratio.

Multilevel modeling was used to estimate the association between NDVI in deciles measured at 210 × 210 m around an individual's residential address between age 0 to 5 years and the outcome of ADHD in a cohort of 814 689 individuals born in Denmark 1992 to 2007 and who were followed from 1997 until 2017.