

Maternal weight, gestational weight gain and preschool wheezing.

The Generation R Study.

Supplement Material

Elisabeth T.M. Leermakers, MSc^{1,2,3}, Agnes M.M. Sonnenschein - van der Voort ,
MSc^{1,2,4}, Romy Gaillard, MSc^{1,2,3}, Albert Hofman MD PhD², Johan C. de Jongste,
MD PhD³, Vincent W.V. Jaddoe, MD PhD^{1,2,3}, Liesbeth Duijts, MD PhD^{2,4,5}

¹The Generation R Study Group,

²Department of Epidemiology,

³Department of Paediatrics,

⁴Department of Paediatrics, Division of Respiratory Medicine,

⁵Department of Paediatrics, Division of Neonatology;

Erasmus Medical Center, Rotterdam, the Netherlands.

Corresponding author

Dr. Liesbeth Duijts, MD, PhD, Erasmus Medical Center - Sophia Children's Hospital, Sp-

3435; PO Box 2060, 3000 CB Rotterdam, The Netherlands.

Tel: *31 10 7036263 Fax: *31 10 7036811 E-mail: l.duijts@erasmusmc.nl

Supplementary Table S1. Mean gestational weight gain per prepregnancy body mass category (n = 4,656).¹

	Prepregnancy body mass index category			
	Underweight n=709	Normal weight n=2,767	Overweight n=819	Obese n=331
Gestational weight gain (kg)	10.9 (3.8)	10.9 (4.3)	9.7 (5.2)	7.5 (6.9)

¹Values are means (SD). Missing values for weight gain were for underweight n=18, for normal weight n=68, for overweight n=21 and for obese n=14.

Supplementary Table S2. Associations of maternal prepregnancy body mass index and wheezing in the first 4 years of life (n = 4,656).

n=4,656	Overall odds ratios (95% confidence interval) of wheezing age 1 to 4			
	Model 1	Model 2 (Model 1 + growth)	Model 3 (Model 1 + LRTI)	Model 4 (Model 1 + eczema)
Age 1				
No maternal history of asthma or atopy				
Underweight	0.89 (0.68, 1.16)	0.89 (0.68, 1.16)	0.85 (0.63, 1.13)	0.89 (0.68, 1.16)
Normal weight	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
Overweight	0.99 (0.78, 1.26)	0.99 (0.78, 1.26)	0.96 (0.73, 1.25)	1.00 (0.78, 1.27)
Obese	0.74 (0.49, 1.12)	0.74 (0.49, 1.12)	0.68 (0.43, 1.06)	0.73 (0.48, 1.11)
Prepregnancy body mass index ¹	0.96 (0.87, 1.06)	0.96 (0.87, 1.06)	0.96 (0.85, 1.07)	0.96 (0.87, 1.06)
p for trend ¹	p=0.42	p=0.42	p=0.43	p=0.40
Maternal history of asthma or atopy				
Underweight	1.25 (0.92, 1.69)	1.25 (0.92, 1.70)	1.37 (0.98, 1.89)	1.25 (0.92, 1.69)
Normal weight	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
Overweight	0.97 (0.71, 1.32)	0.96 (0.70, 1.31)	1.05 (0.74, 1.50)	0.96 (0.70, 1.32)
Obese	1.10 (0.71, 1.70)	1.07 (0.69, 1.66)	1.07 (0.65, 1.76)	1.09 (0.70, 1.70)
Prepregnancy body mass index ¹	0.97 (1.00, 1.11)	0.99 (0.89, 1.11)	0.96 (0.85, 1.07)	1.00 (0.89, 1.11)
p for trend ¹	p=0.97	p=0.88	p=0.43	p=0.75
Age 2				
No maternal history of asthma or atopy				
Underweight	1.00 (0.74, 1.35)	1.00 (0.75, 1.35)	0.98 (0.72, 1.33)	1.01 (0.75, 1.36)
Normal weight	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
Overweight	1.10 (0.83, 1.45)	1.10 (0.83, 1.45)	1.07 (0.80, 1.42)	1.11 (0.85, 1.47)
Obese	1.05 (0.70, 1.59)	1.05 (0.70, 1.58)	0.95 (0.62, 1.45)	1.05 (0.70, 1.59)
Prepregnancy body mass index ¹	1.01 (0.91, 1.13)	1.01 (0.91, 1.13)	0.99 (0.88, 1.11)	1.01 (0.91, 1.13)

p for trend ¹	p=0.81	p=0.83	p=0.87	p=0.80
Maternal history of asthma or atopy				
Underweight	1.14 (0.80, 1.63)	1.25 (0.92, 1.70)	1.21 (0.84, 1.74)	1.14 (0.80, 1.64)
Normal weight	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
Overweight	0.89 (0.64, 1.25)	0.88 (0.63, 1.23)	0.88 (0.62, 1.25)	0.89 (0.64, 1.25)
Obese	1.60 (0.95, 2.71)	1.54 (0.91, 2.63)	1.46 (0.82, 2.59)	1.60 (0.94, 2.71)
Prepregnancy body mass index ¹	1.09 (0.96, 1.23)	1.07 (0.94, 1.22)	0.99 (0.88, 1.11)	1.09 (0.96, 1.23)
p for trend ¹	p=0.20	p=0.28	p=0.87	p=0.20
Age 3				
No maternal history of asthma or atopy				
Underweight	0.88 (0.60, 1.30)	0.89 (0.60, 1.30)	0.83 (0.56, 1.22)	0.88 (0.60, 1.29)
Normal weight	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
Overweight	1.16 (0.82, 1.63)	1.16 (0.82, 1.62)	1.18 (0.83, 1.68)	1.16 (0.83, 1.63)
Obese	1.01 (0.61, 1.67)	1.00 (0.61, 1.65)	1.03 (0.60, 1.77)	1.00 (0.60, 1.66)
Prepregnancy body mass index ¹	1.06 (0.93, 1.21)	1.06 (0.93, 1.21)	1.09 (0.95, 1.25)	1.06 (0.93, 1.21)
p for trend ¹	p=0.37	p=0.38	p=0.23	p=0.38
Maternal history of asthma or atopy				
Underweight	1.22 (0.83, 1.77)	1.24 (0.84, 1.81)	1.24 (0.83, 1.87)	1.22 (0.83, 1.78)
Normal weight	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
Overweight	1.13 (0.78, 1.62)	1.11 (0.77, 1.60)	1.18 (0.79, 1.75)	1.13 (0.79, 1.63)
Obese	2.00(1.25, 3.20)**	1.91 (1.20, 3.05)**	1.92 (1.14, 3.21)*	2.01 (1.26, 3.21)**
Prepregnancy body mass index ¹	1.13 (0.99, 1.29)	1.11 (0.98, 1.34)	1.11 (0.96, 1.29)	1.13 (0.99, 1.29)
p for trend ¹	p=0.08	p=0.09	p=0.14	p=0.08
Age 4				
No maternal history of asthma or atopy				
Underweight	0.93 (0.63, 1.38)	0.94 (0.63, 1.38)	0.92 (0.61, 1.39)	0.94 (0.64, 1.39)

Normal weight	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
Overweight	1.35 (0.97, 1.88)	1.35 (0.96, 1.88)	1.32 (0.94, 1.85)	1.35 (0.97, 1.89)
Obese	1.32 (0.81, 2.14)	1.35 (0.96, 1.88)	1.25 (0.75, 2.07)	1.32 (0.82, 2.15)
Prepregnancy body mass index ¹	1.14 (1.01, 1.30)*	1.14 (1.01, 1.30)*	1.14 (0.99, 1.27)	1.14 (1.01, 1.30)*
p for trend ¹	p=0.04	p=0.04	p=0.06	p=0.04
Maternal history of asthma or atopy				
Underweight	1.02 (0.68, 1.55)	1.05 (0.69, 1.81)	1.02 (0.66, 1.57)	1.03 (0.68, 1.55)
Normal weight	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
Overweight	0.95 (0.62, 1.45)	0.93 (0.61, 1.41)	0.94 (0.61, 1.47)	1.03 (0.68, 1.55)
Obese	1.62 (0.95, 2.74)	1.50 (0.87, 2.59)	1.53 (0.88, 2.66)	1.62 (0.95, 2.75)
Prepregnancy body mass index ¹	1.18 (1.01, 1.36)*	1.14 (0.98, 1.34)*	1.16 (1.00, 1.35)*	1.18 (1.01, 1.37)*
p for trend ¹	p=0.03	p=0.08	p=0.05	p=0.03

Values are odds ratios (with 95% confidence interval) and reflect the associations of different prepregnancy body mass index groups with wheezing of the children between the age 1 and 4 years, compared to the normal prepregnancy body mass index weight group, 20-24.9 kg/m², using generalized estimating equation models.

¹Tests for trend were based on generalized estimating equation models with prepregnancy body mass index (SDS) as a continuous variable and reflect the association with wheezing per SD increase of prepregnancy body mass index.

Model 1 was adjusted for maternal age, parity, ethnicity, education level, distress during pregnancy, smoking during pregnancy, pet keeping, gestational hypertensive disorders, diabetes gravidarum, gestational age at enrolment, gestational age at measurement, gestational weight gain, and child's sex, gestational age at birth, birth weight, breastfeeding and daycare attendance. Model 2, 3 and 4 were additionally adjusted for length and weight, lower respiratory tract infections and eczema at the corresponding ages, respectively.

*P-value <0.05; **P-value <0.01

Supplementary Table S3. Associations of gestational weight gain and wheezing in the first 4 years of life (n = 4,535).

n=4,054	Overall odds ratios (95% confidence interval) of wheezing age 1 to 4			
	Model 1	Model 2 (Model 1 + growth)	Model 3 (Model 1 + LRTI's)	Model 4 (Model 1 + eczema)
Age 1				
No maternal history of asthma or atopy				
Weight gain (SDS)	1.14 (1.04, 1.25)** p<0.01	1.14 (1.04, 1.25)** p<0.01	1.13 (1.02, 1.25)** p=0.02	1.14 (1.04, 1.25)* p<0.01
Maternal history of asthma or atopy				
Weight gain (SDS)	1.12 (1.00, 1.25) p=0.05	1.12 (1.00, 1.25) p=0.06	1.10 (0.97, 1.25) p=0.15	1.12 (1.00, 1.25) p=0.05
Age 2				
No maternal history of asthma or atopy				
Weight gain (SDS)	1.05 (0.95, 1.17) p=0.32	1.05 (0.95, 1.17) p=0.31	1.08 (0.97, 1.20) p=0.16	1.05 (0.95, 1.16) p=0.33
Maternal history of asthma or atopy				
Weight gain (SDS)	1.11 (0.97, 1.27) p=0.13	1.11 (0.97, 1.27) p=0.14	1.10 (0.95, 1.27) p=0.19	1.11 (0.97, 1.27) p=0.13
Age 3				
No maternal history of asthma or atopy				
Weight gain (SDS)	1.05 (0.91, 1.20) p=0.49	1.05 (0.92, 1.20) p=0.49	1.04 (0.90, 1.20) p=0.57	1.05 (0.91, 1.20) p=0.50
Maternal history of asthma or atopy				
Weight gain (SDS)	1.07 (0.91, 1.25) p=0.43	1.06 (0.90, 1.25) p=0.49	1.06 (0.91, 1.24) p=0.44	1.07 (0.91, 1.25) p=0.44
Age 4				
No maternal history of asthma or atopy				
Weight gain (SDS)	1.11 (0.98, 1.26) p=0.09	1.11 (0.98, 1.26) p=0.10	1.10 (0.97, 1.25) p=0.15	1.11 (0.98, 1.26) p=0.09
Maternal history of asthma or atopy				
Weight gain (SDS)	0.99 (0.85, 1.14) p=0.85	0.98 (0.84, 1.13) p=0.75	1.00 (0.86, 1.17) p=1.00	0.99 (0.85, 1.14) p=0.86

Values are odds ratios (with 95% confidence interval) and were based on generalized estimating equation models with gestational weight gain (SDS) as a continuous variable and reflect the association with wheezing per SDS increase of gestational weight gain. Models were adjusted for maternal age, parity, ethnicity, education level, distress during pregnancy, smoking during pregnancy, pet keeping, gestational hypertensive disorders, diabetes gravidarum, gestational age at enrolment, gestational age at measurement, gestational weight gain, and child's sex, gestational age at birth, birth weight, breastfeeding and daycare attendance. *P-value <0.05; **P-value <0.01.

Supplementary Figure S1. Bland-Altman plot (n = 4,656).

