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Assessment of the weight status using the Body Mass Index (BMI) in 24 months old children

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EUSUHM 2017, September 6 – 8, Leuven, Belgium

Introduction

- Childhood obesity is a serious challenge for youth health care;
- Systematic monitoring of the weight status provides useful data on prevalence and trends;
- The BMI is a convenient parameter:
  - Based on height and weight only;
  - Known properties (high specificity)
  - International consensus
  - Which cut-offs?
- Need for a representative sample

Outline

- Criteria for the BMI
  - ~~Local BMI curve~~
  - International Obesity Task Force (IOTF) cut-offs
  - Extended IOTF reference
  - WHO growth standards & reference

- Sample?
  - No dedicated surveys!
  - Data from well baby clinics: electronic child health records (Mirage) of Kind en Gezin
  - Validity of estimates (at 24 months)

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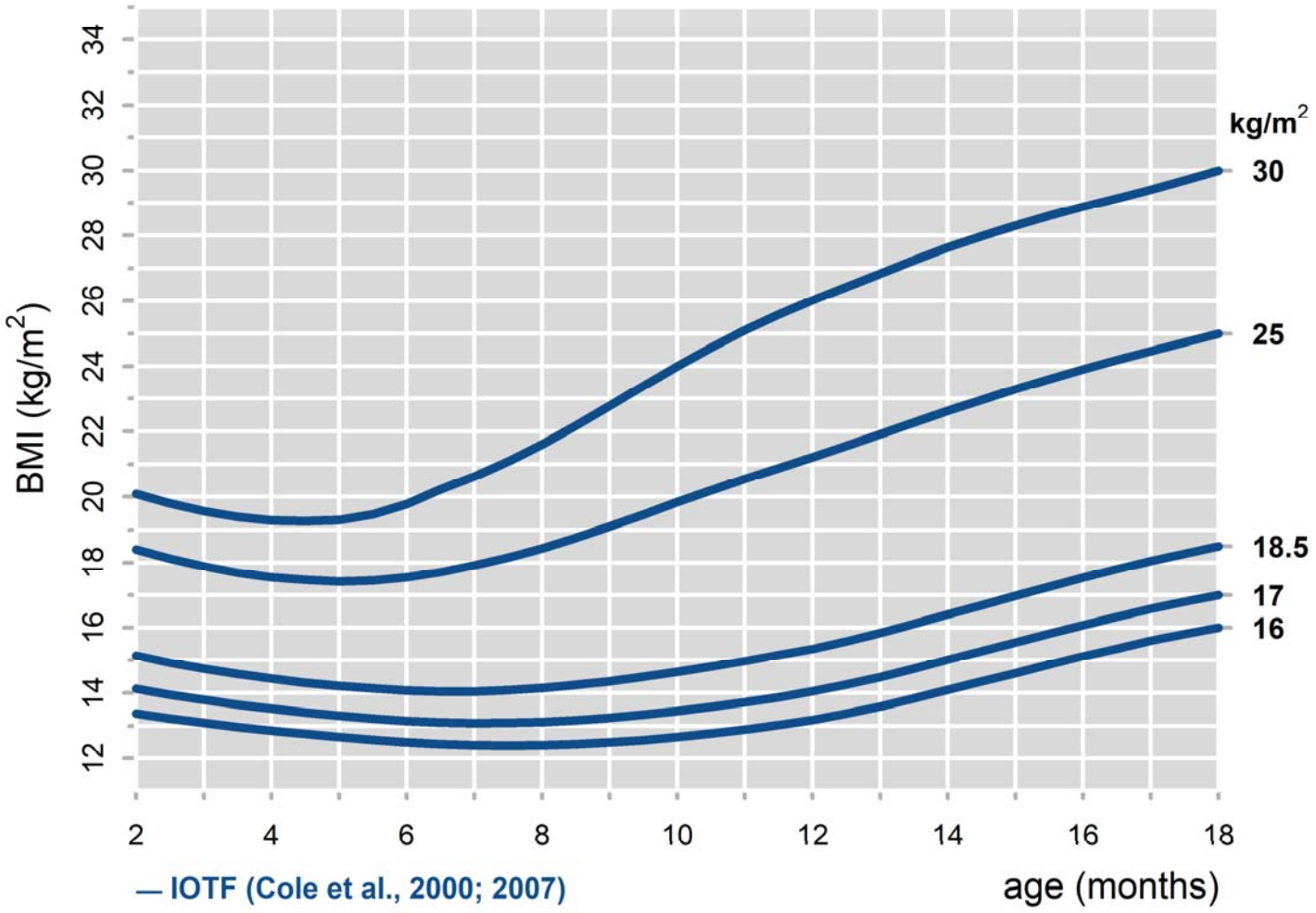
BMI criteria: IOTF



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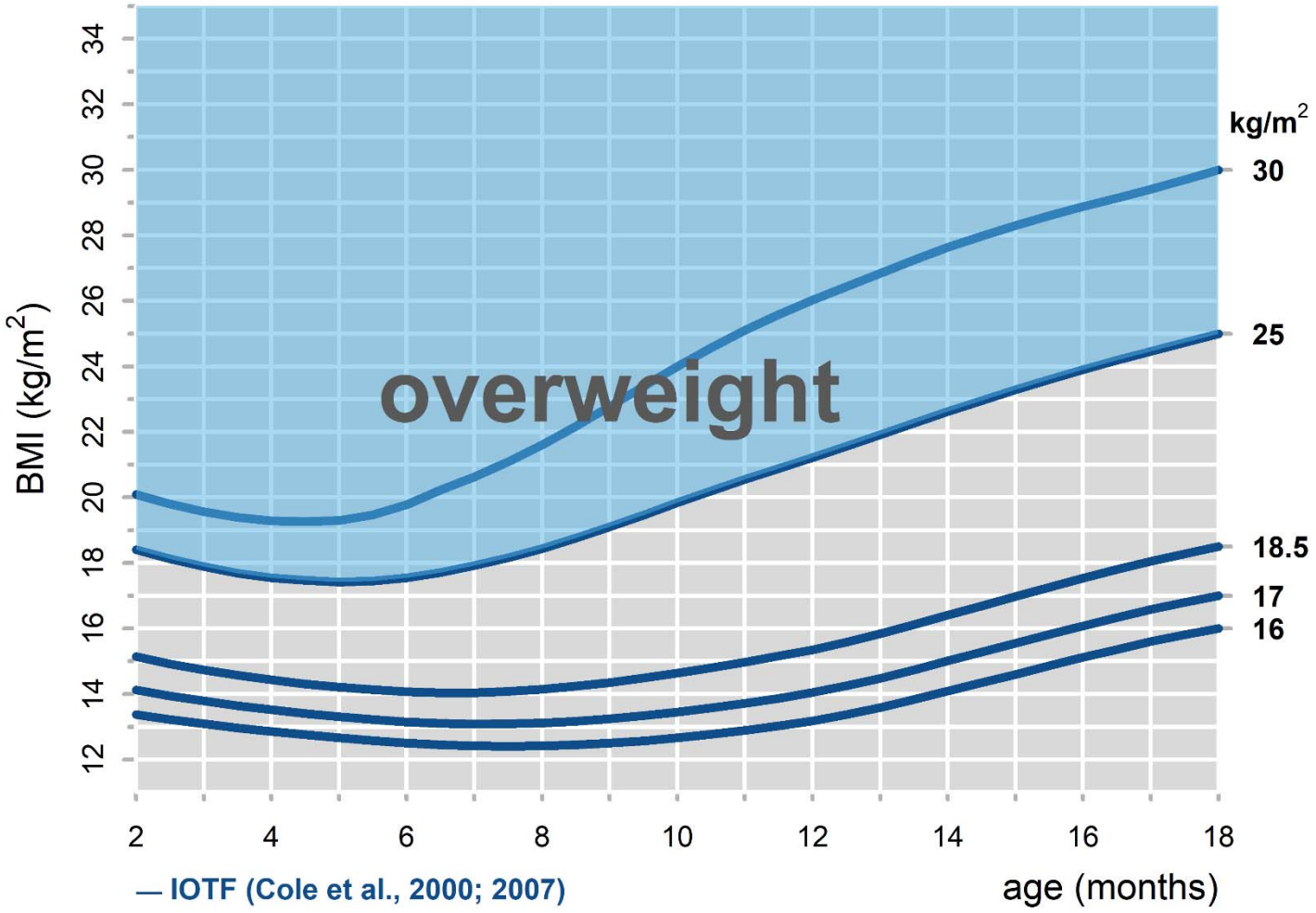

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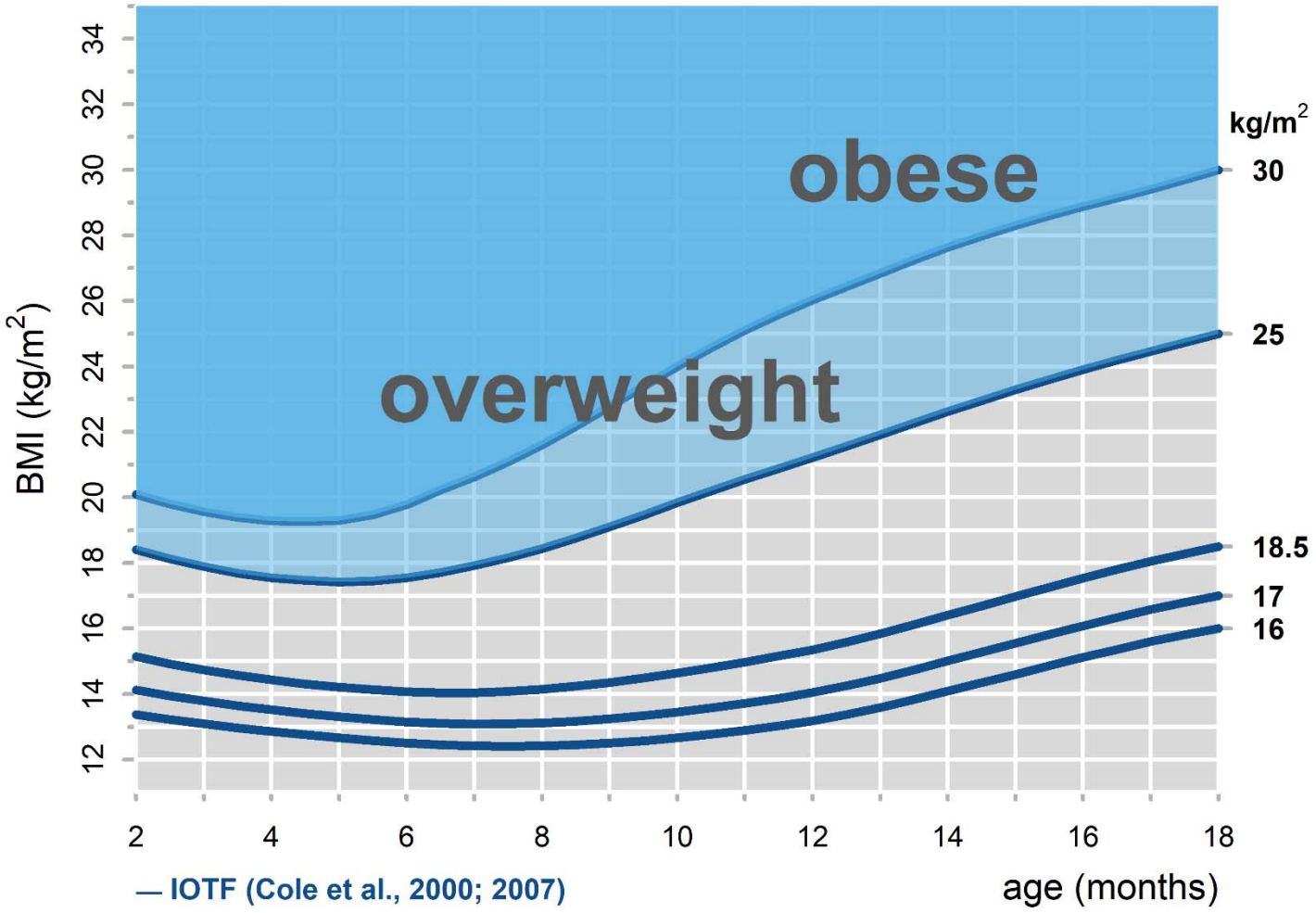

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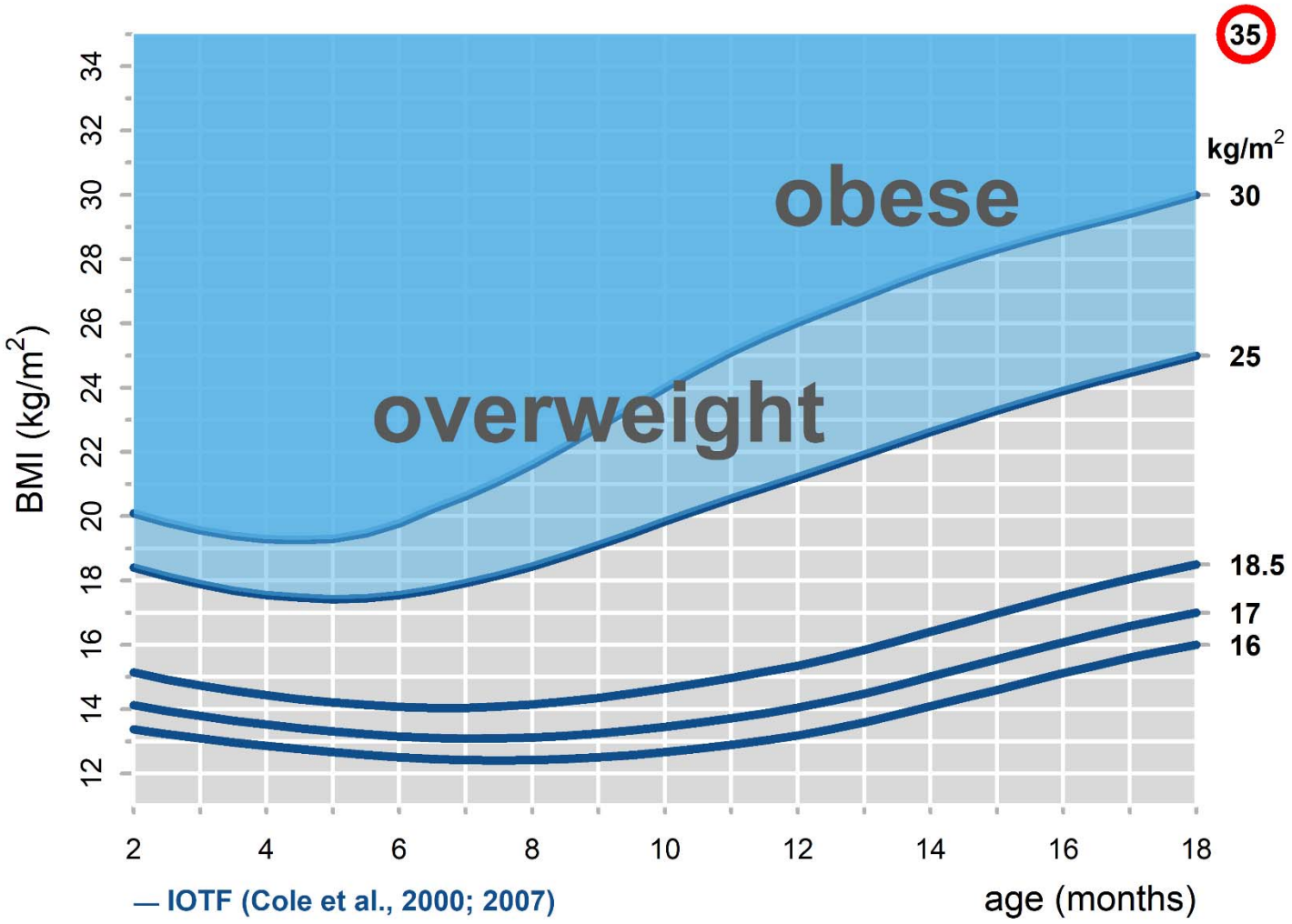

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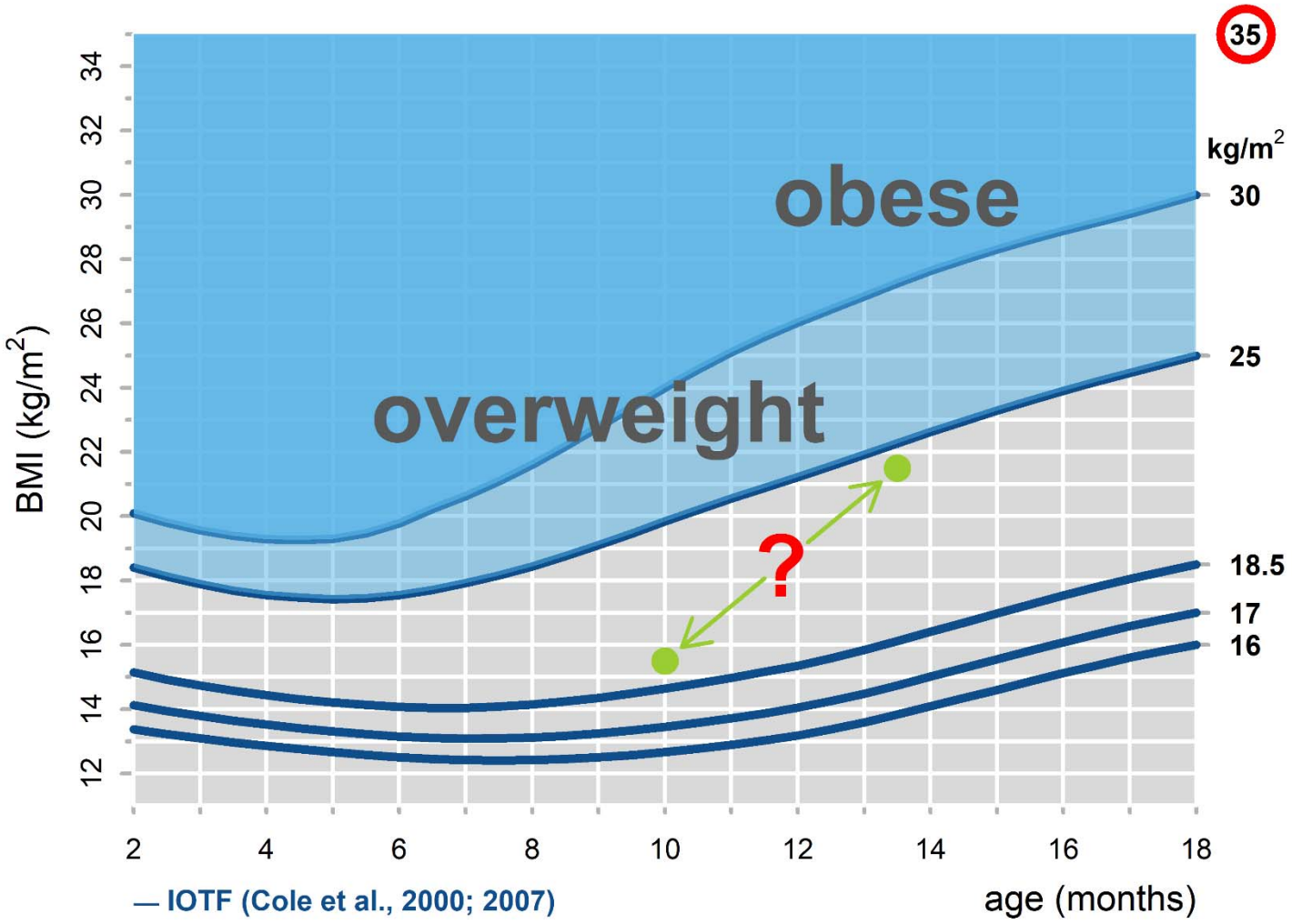
BMI criteria: IOTF



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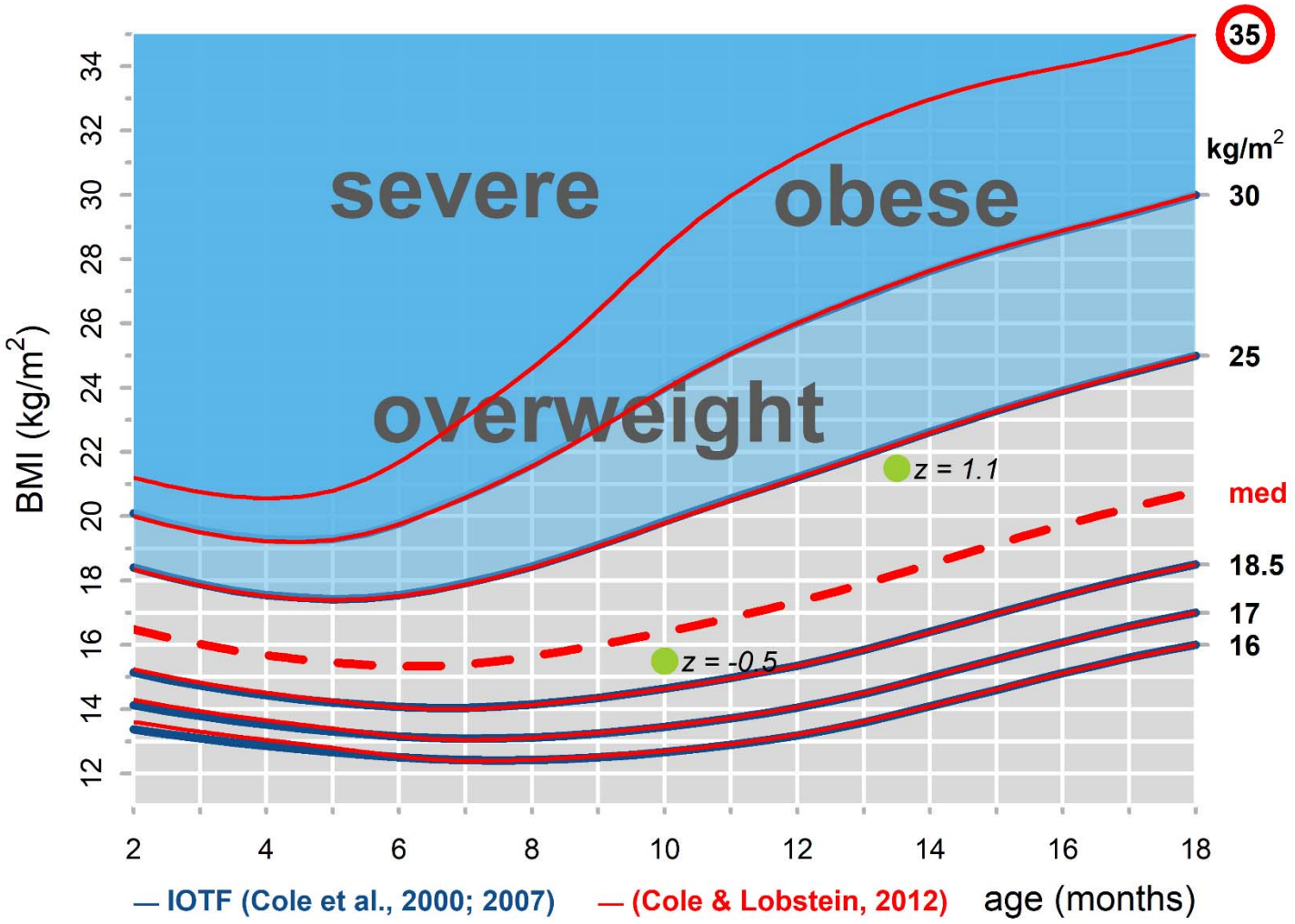
BMI criteria: IOTF (extended)



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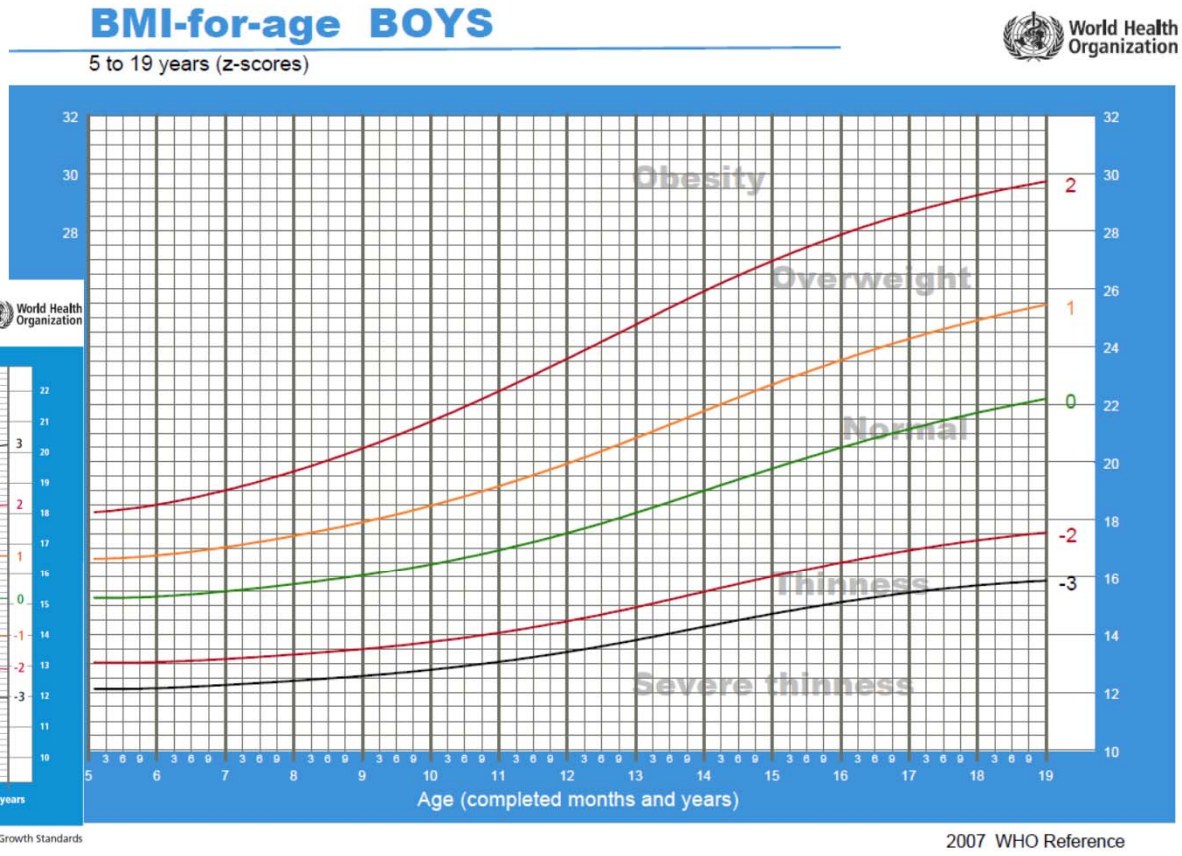
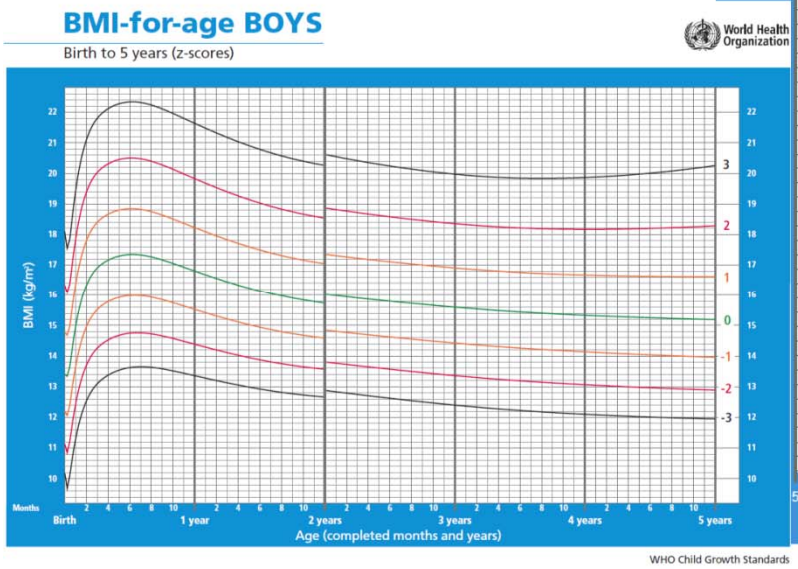
BMI criteria: WHO

Reference (5 – 19 years; NCHS)



Standards (< 5 years; MGRS)



Standards: z < -2: thinness;
z > 2: overweight (z > 1 = risk)
z > 3: obese

Reference: z < -2: thinness
z > 1: overweight
z > 2: obese

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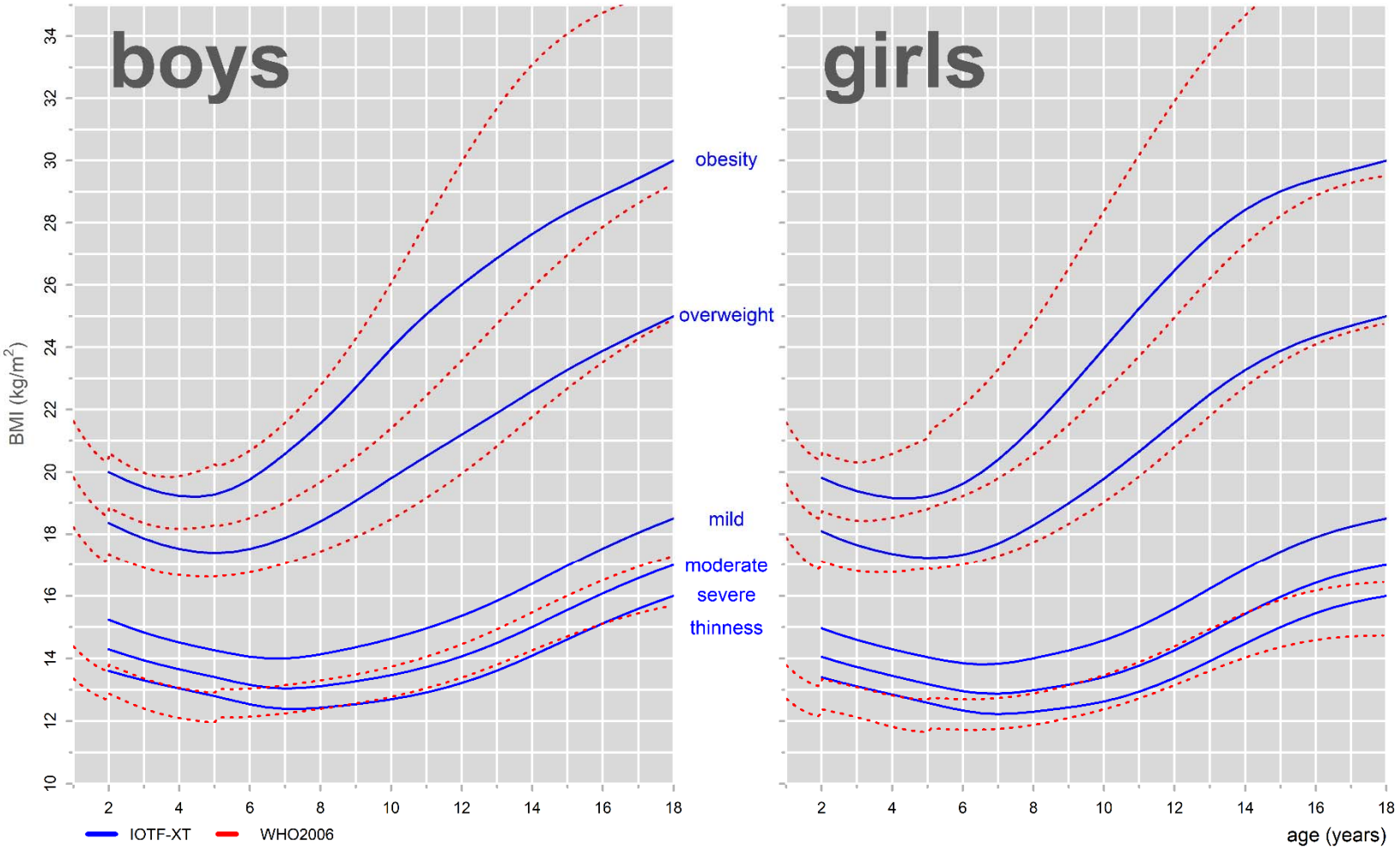
BMI criteria: IOTF vs. WHO



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Sample

- Kind en Gezin (well baby clinics): electronic registration of length, weight, head circumference (Mirage)
- But also (a.o.): size at birth, gestational age, parity, origin (nationality of mother), education (mother), socioeconomic vulnerability, breastfeeding (24h, 6d, 3m, 6m).

- °2011/12:
  - 146.522 children registered in Mirage
  - 98.947 (67,5%) measured 23 – 26 months

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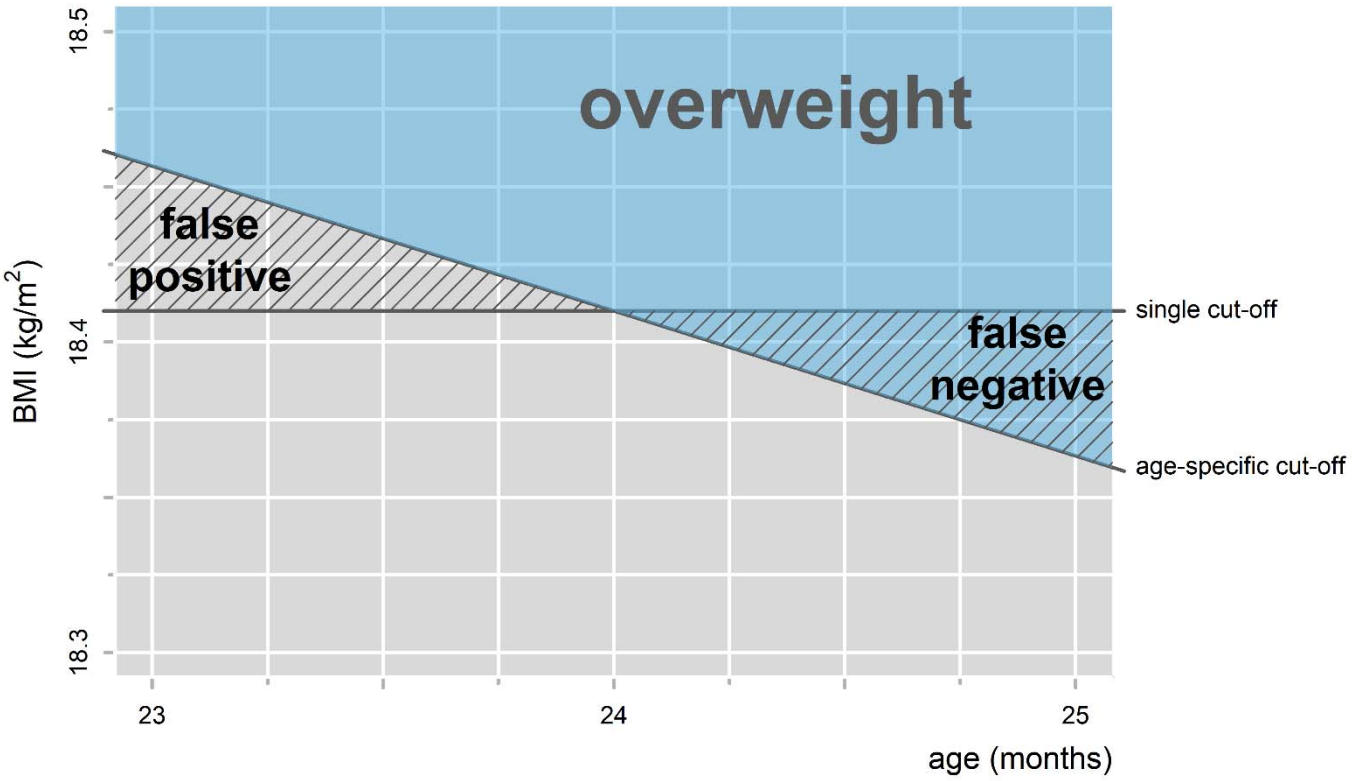
Results: representative sample 24mo?

- Small (1 – 3%) differences compared to whole cohort (origin, education, region, vulnerable situation, …)
- More first- and term born infants
- Statistically significant (large N → ∆0,1 – 0,3% stat. signif.)
- Mainly due to lower response in/near Brussels region

Results: prevalence

- Underweight: < -2 SD (WHO)
- Overweight/obesity: single IOTF cut-off (24mo)



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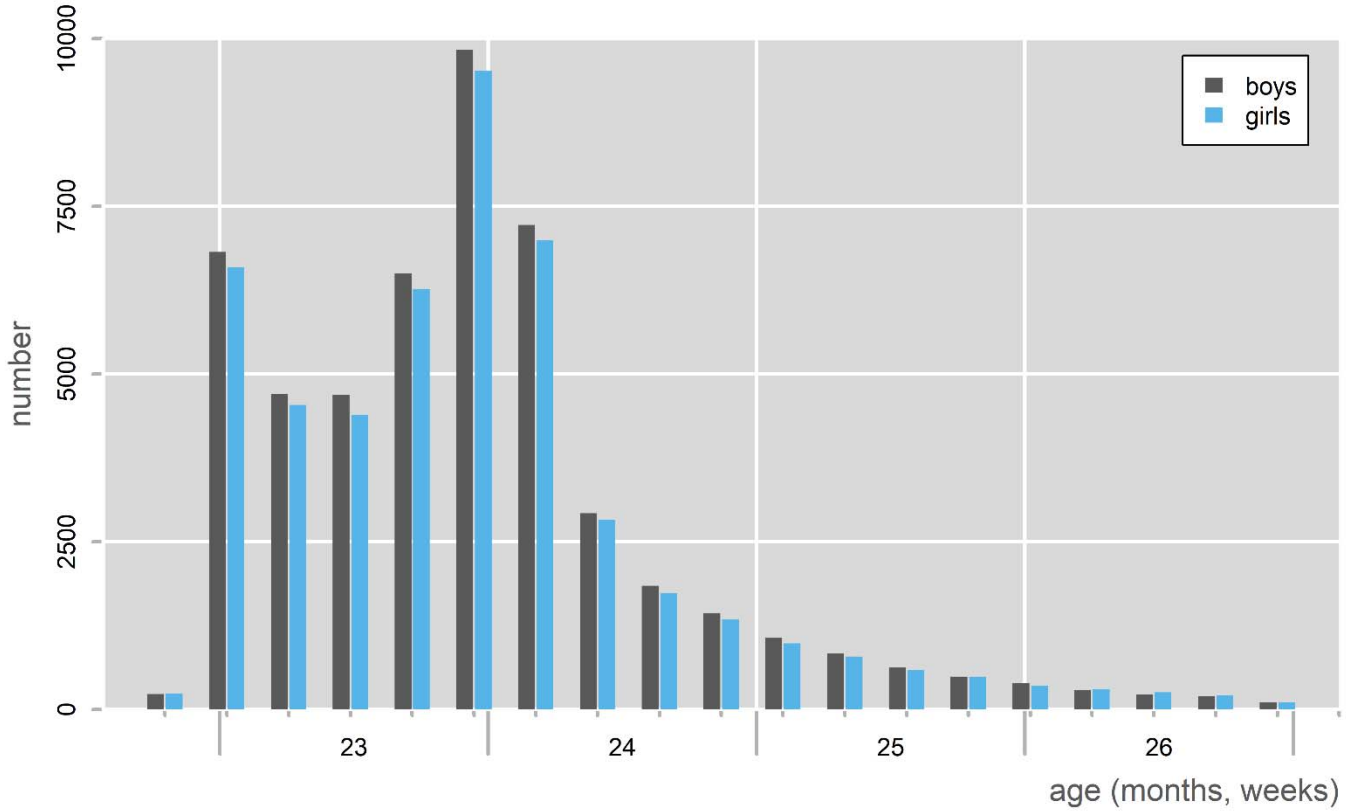

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Results: prevalence

Boys + Girls	IOTF		WHO 2006	
(n = 98873)	%	(95%CI)	%	(95%CI)
Obesity	**1.0**	**1.0 (0.94 – 1.1)**	0.43	(0.39 – 0.47)
Overweight (+ob)	**7.3**	**(7.1 – 7.6)**	3.9	(3.7 – 4.0)
"normal" weight	73.0	(72.6 – 73.4)	77.1	(76.8 – 77.3)
Thinness (I – III)	19.6	(19.3 – 20.0)		
Thinness (II – III)	4.3	(4.1 – 4.5)	**1.2**	**(1.1 – 1.3)**
Thinness (III)	0.89	(0.80 – 0.97)	**0.082**	**(0.07 – 0.10)**

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Results: Factors

- Usual suspects, e.g. origin, education, …

	Overgewicht (IOTF)				Obesitas (IOTF)				Ondergewicht (WHO SDS < -2)				
	Prevalentie		Log. Reg		Prevalentie		Log.Reg		n	prevalentie		Log. Reg	
	%	(95%BI)	OR(s)	OR(m)	%	(95%BI)	OR(s)	OR(m)		%	(95%BI)	OR(s)	OR(m)
Nationaliteit van de moeder													
België	6.37	(6.20 - 6.55)	*referentie*		0.61	(0.56 - 0.67)	*referentie*		73924	1.18	(1.10 - 1.26)	*referentie*	
Noord-/West-Europa + rijke OESO	8.14	(7.13 - 9.27)	1.30***	1.19*	0.96	(0.63 - 1.43)	1.56*	1.31	2617	0.84	(0.54 - 1.29)	0.71	0.72
Zuid-Europa	10.34	(8.27 - 12.85)	1.69***	1.47**	1.93	(1.10 - 3.30)	3.19***	2.41**	725	0.97	(0.42 - 2.07)	0.82	0.77
Oost-Europa en voorm. Oostblok	9.51	(8.69 - 10.39)	1.54***	1.34***	2.03	(1.65 - 2.48)	3.35***	2.41***	4691	1.64	(1.31 - 2.06)	1.40**	1.15
Maghreb	15.58	(14.65 - 16.55)	2.71***	2.18***	2.63	(2.24 - 3.09)	4.38***	2.82***	5662	0.92	(0.69 - 1.21)	0.78°	0.64**
Andere landen van Afrika	13.10	(11.97 - 14.32)	2.21***	1.83***	2.58	(2.08 - 3.20)	4.30***	2.85***	3251	1.08	(0.76 - 1.51)	0.91	0.74°
Turkije	12.58	(11.39 - 13.87)	2.11***	1.78***	2.37	(1.86 - 3.02)	3.94***	2.73***	2823	0.60	(0.36 - 0.98)	0.51**	0.40***
Andere landen van Azië	7.59	(6.72 - 8.56)	1.21**	1.02	1.30	(0.95 - 1.76)	2.14***	1.49*	3308	2.09	(1.64 - 2.65)	1.79***	1.48**
Zuid- en Centraal Amerika	10.53	(8.28 - 13.29)	1.73***	1.52**	1.13	(0.50 - 2.43)	1.86	1.40	617	1.30	(0.60 - 2.64)	1.10	0.97
Niet gekend	11.31	(9.64 - 13.23)	1.87***	1.74***	1.99	(1.32 - 2.97)	3.30***	2.54***	1255	1.27	(0.76 - 2.11)	1.08	0.92
Opleiding van de moeder													
Laag	10.21	(9.73 - 10.72)	1.32***	1.02	1.77	(1.57 - 2.00)	1.78***	1.17°	14512	1.56	(1.37 - 1.78)	1.29**	1.38***
Gemiddeld	7.93	(7.61 - 8.26)	*referentie*		1.00	(0.89 - 1.13)	*referentie*		26891	1.22	(1.09 - 1.36)	*referentie*	
hoog	6.53	(6.32 - 6.75)	0.81***	0.91**	0.62	(0.55 - 0.69)	0.62***	0.78**	50760	1.03	(0.94 - 1.12)	0.84*	0.81**
Niet gekend/niet van toepassing	9.48	(8.79 - 10.21)	1.22***	1.01	1.79	(1.49 - 2.14)	1.80***	1.27*	6710	1.48	(1.21 - 1.80)	1.22°	1.21

OR(s): Odds Ratio, enkelvoudige logistische regressie; **OR(m)**: Odds Ratio, meervoudige logisctische regressie, gecorrigeerd voor alle andere factoren in de tabel; ° p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001

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Conclusions

- Choice of indicator is important *(Please do tell which one you used!)*
- Data allow meaningful stats (trends, groups at risk)
- Register = possibly (very) large N
  - easy to obtain statistical significance;
  - need to define relevant differences in advance
- Relatively low prevalence
  - At 24 Months!
  - Many more at risk for overweight later in life
  - Some groups high risk
  - Time for action

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