

Nutritional survey in a Spanish autonomous region: thinness, overweight and obesity in children attended in primary care centers.

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Purpose of this lecture

To summarise the results of the Nutritional Survey made from existing medical history computer records in primary care (PC) in the Public Health Service of Asturias

OBJECTIVES

ASTURIAS

SPAIN



Research objectives

Asses the nutritional status of children

- To quantify children with any altered parameters: thinness, overweight, obesity, stunting.
- To measure the degree of alteration of the parameter
- To locate the results geographically; global, health areas, Basic Zones, quota
- To return personalized information to professionals and managers



Novelty of this study

- 1. Makes a diagnosis of each concrete area using existing medical records.**
- 2. Provides useful bidirectional information for professionals and managers.**
- 3. Identifies priority areas. Each professional can identify children with altered values of Z-standard and plan new actions.**

Methodology

- **Cross-sectional, retrospective and descriptive design**
- **Universe of the study: Children < 14 years old born between 1/01/1998 and 3/2012 and living in Asturias.**
- **Data source: Medical computer records in Primary Care (OMI-AP system)**

Variables:

- **Last weight and height** measured on the same day, date of birth and measurement, sex, basic health center code, area code, paediatrician code, and country of birth.



Anthropometric indicators

- **Weight-for-age**
- **Length/height for age**
- **Weight for length/ height (only < 5 years old)**
- **BMI for age**

Tools used

Charts

- **Preschool children (0-60 m): WHO child growth Standards (2006)**
- **School children > 5 years WHO reference 2007**

Software

- **ANTHRO (0-60 months)**
- **ANTHRO PLUS**
- **R.2.14 To compare differences between areas and zones**

INDICATORS - WHO CUT-OFFS

WHO criteria

Overweight	BMI	>+1 SD	(≥ P85)
Obesity	BMI	>+2 SD	(≥ P97,7)
Severe Obesity	BMI	>+3 SD	(P99)
Thinness:	BMI	< -2 SD	
Low Height / Length / Age		< -2 SD	

In children <5 years old (60 months) WHO recommends the term overweight for BMI > +2 SD to avoid the use of restrictive diets in times of significant growth

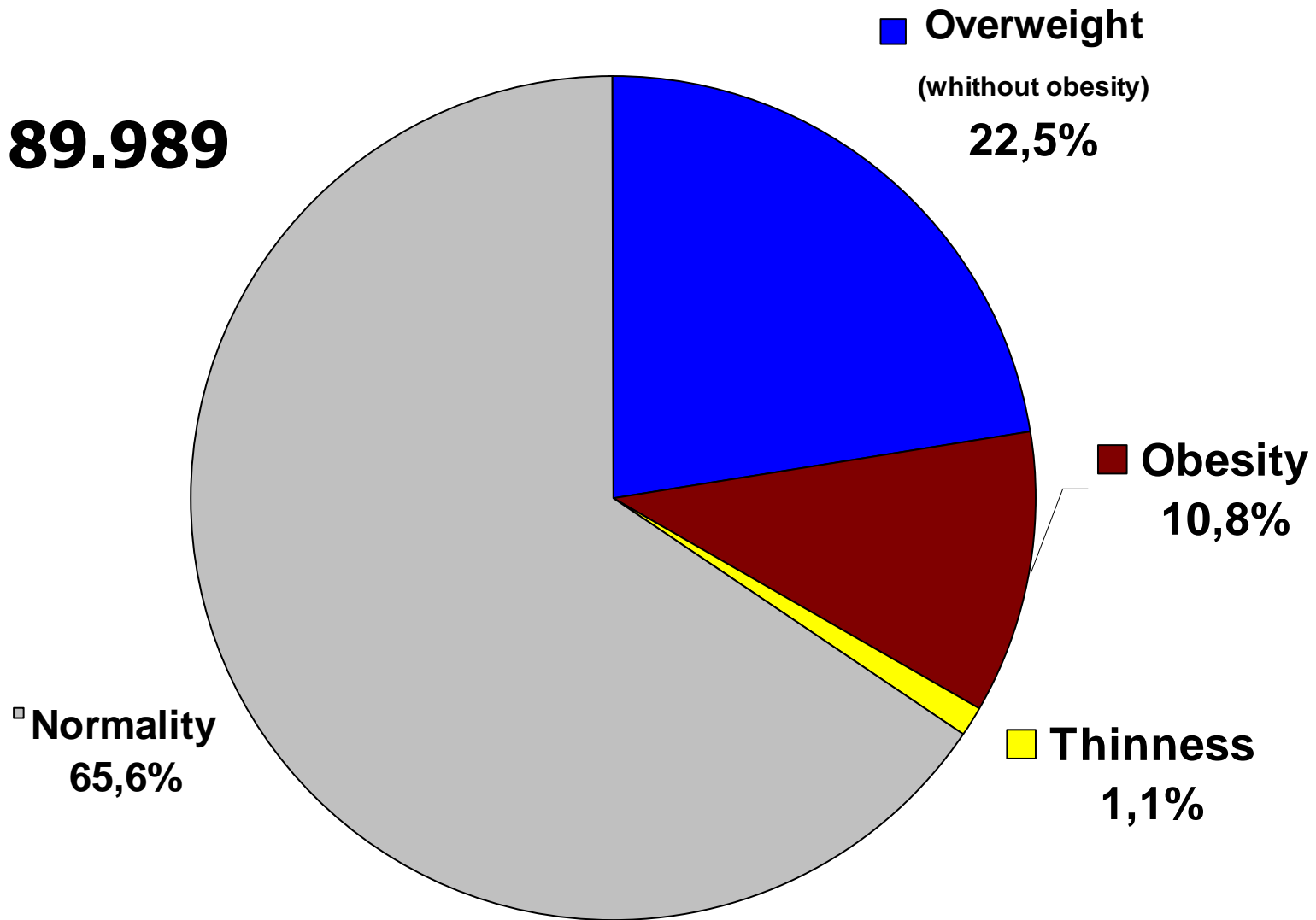
M. De Onis & T. Lobstein: **Defining obesity risk status in the general childhood population:**

Which cut-offs should we use? *International Journal of Pediatric Obesity*, 2010; Early Online, 1–3

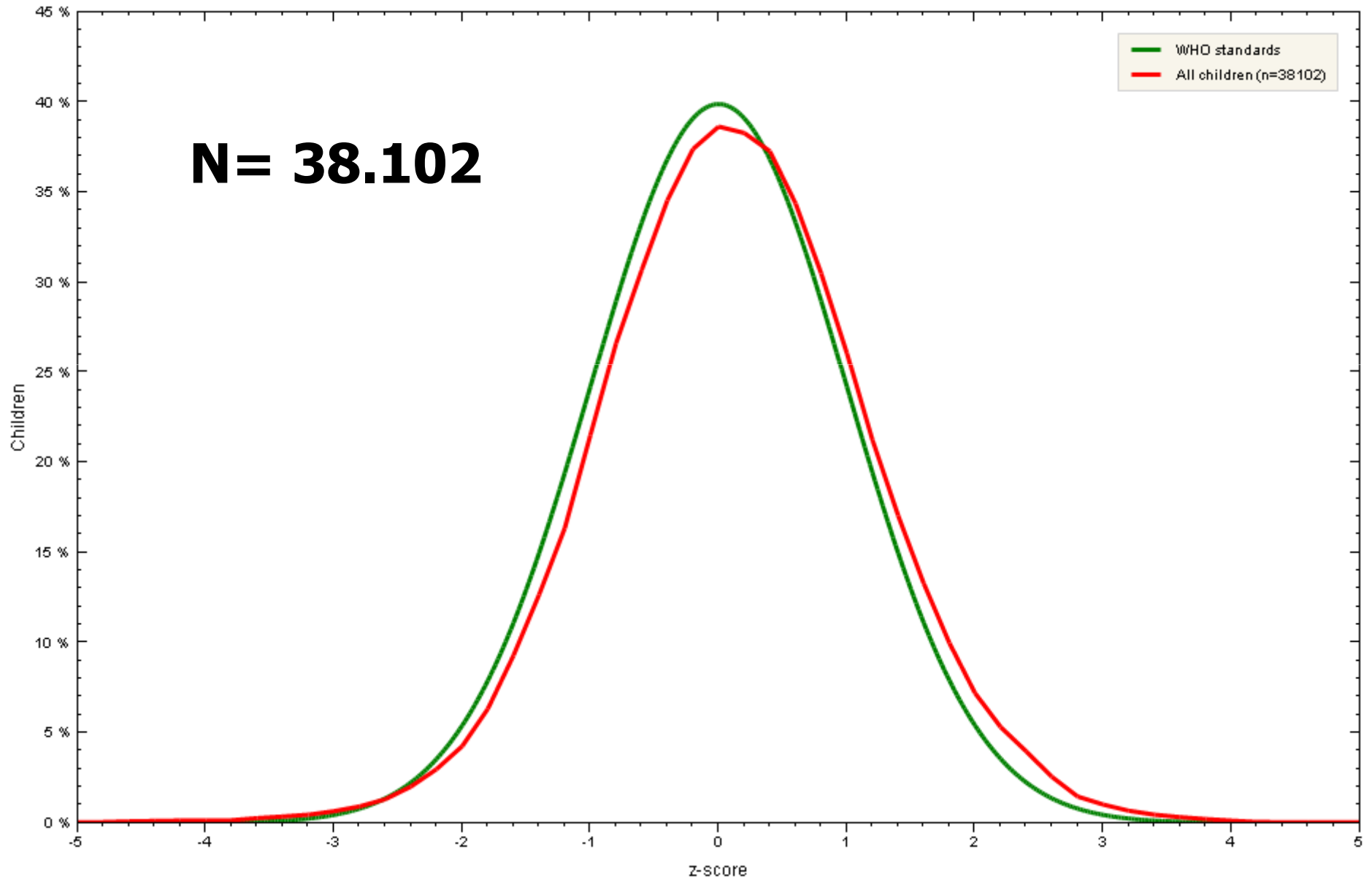
OVERALL RESULTS

Overall Results

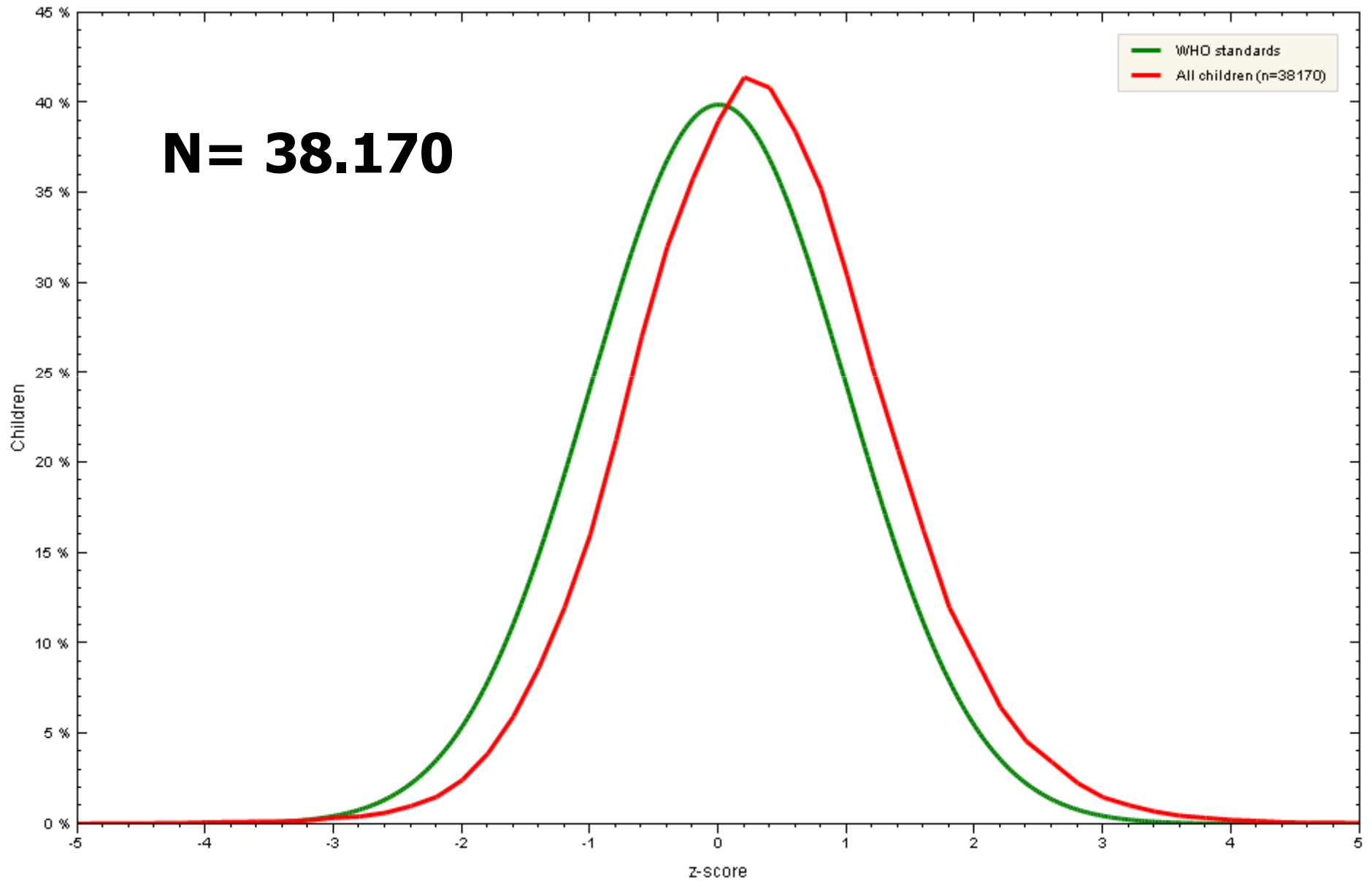
N= 89.989



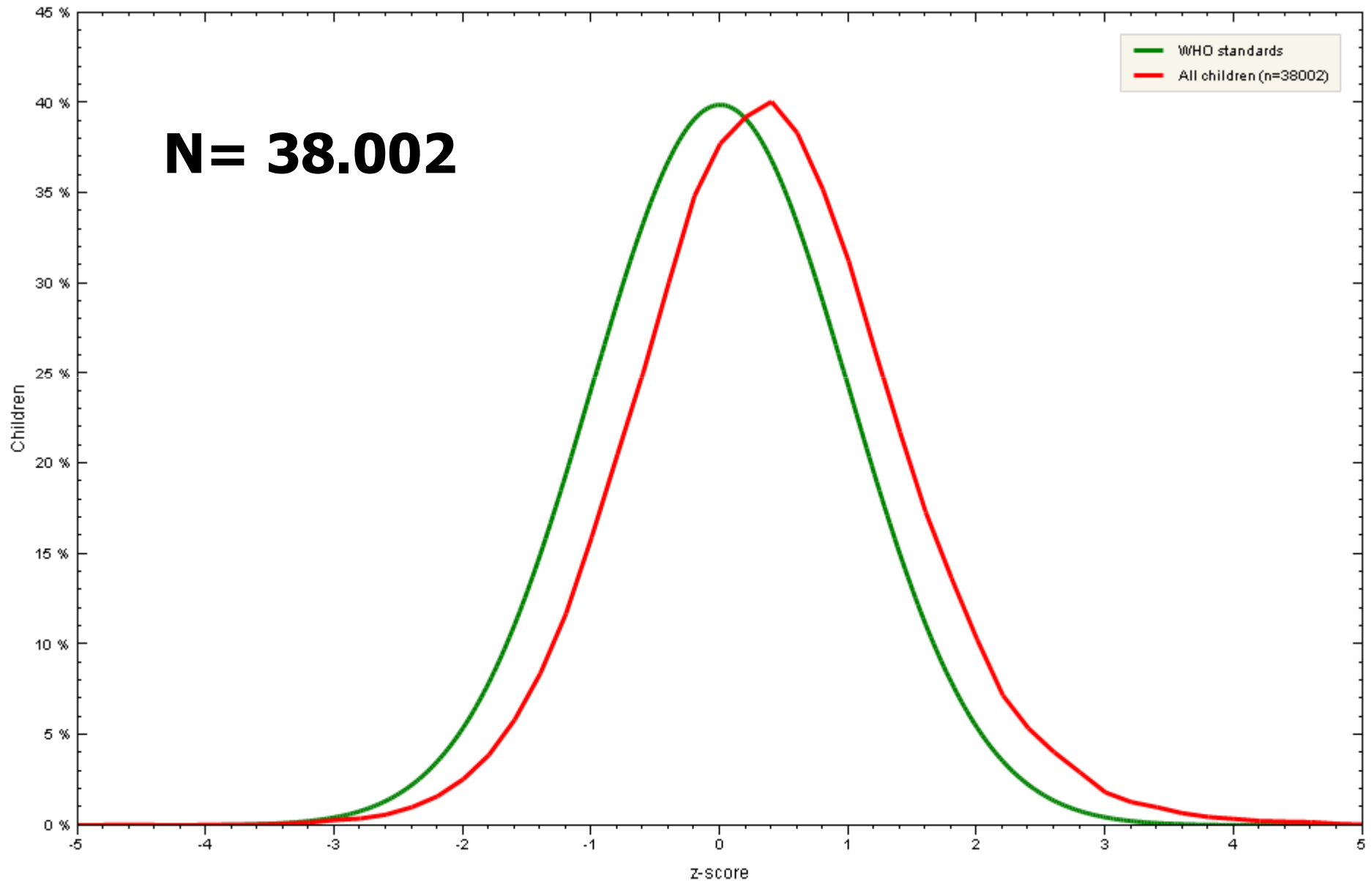
Asturias. Children < 5y (0- 60m) Length/Height for age.



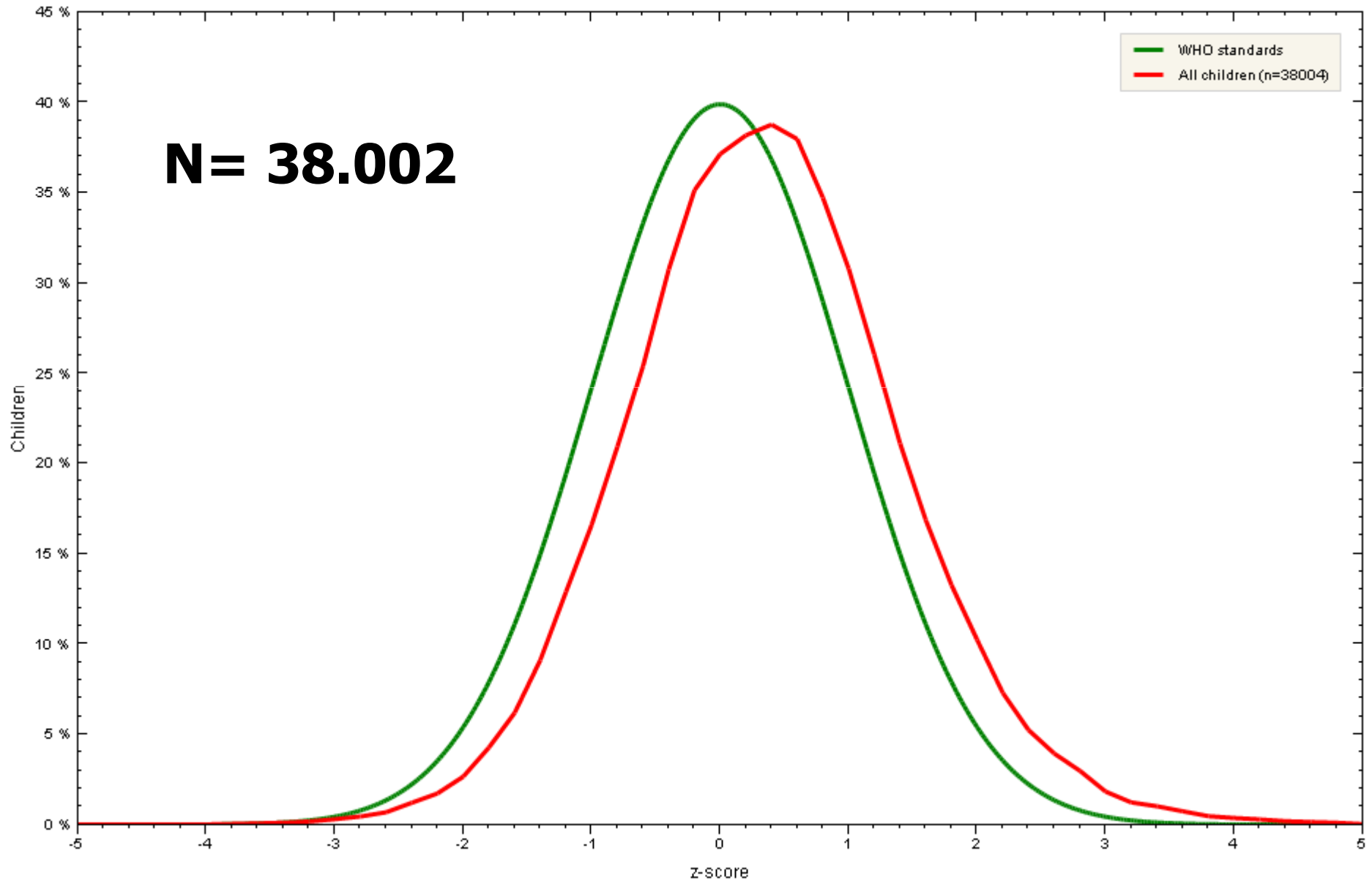
Asturias. Children < 5y (0- 60m) Weight for age.



Asturias. Children < 5y (0- 60m) Weight for length/height



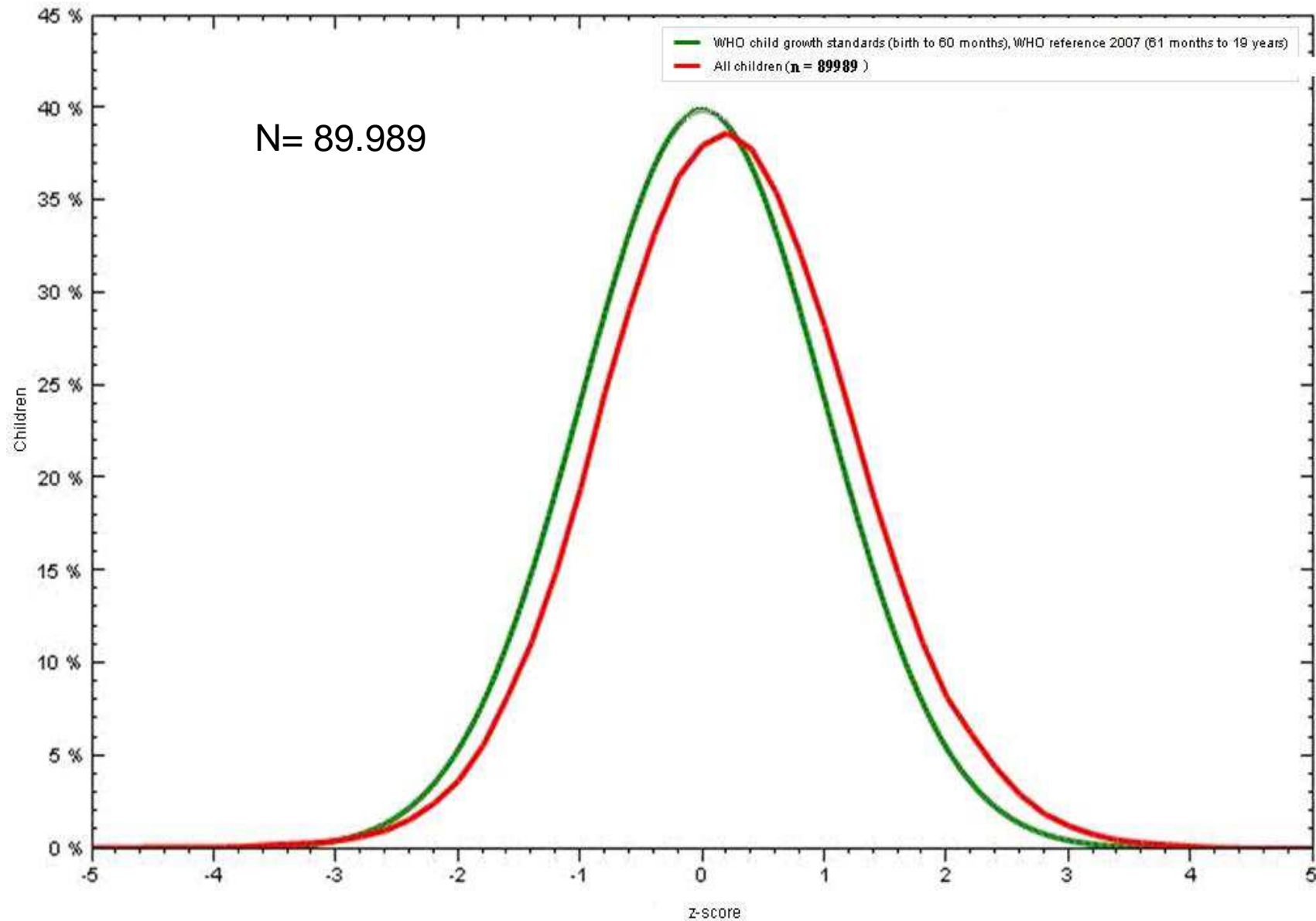
Asturias. Children < 5y (0- 60m) BMI for age



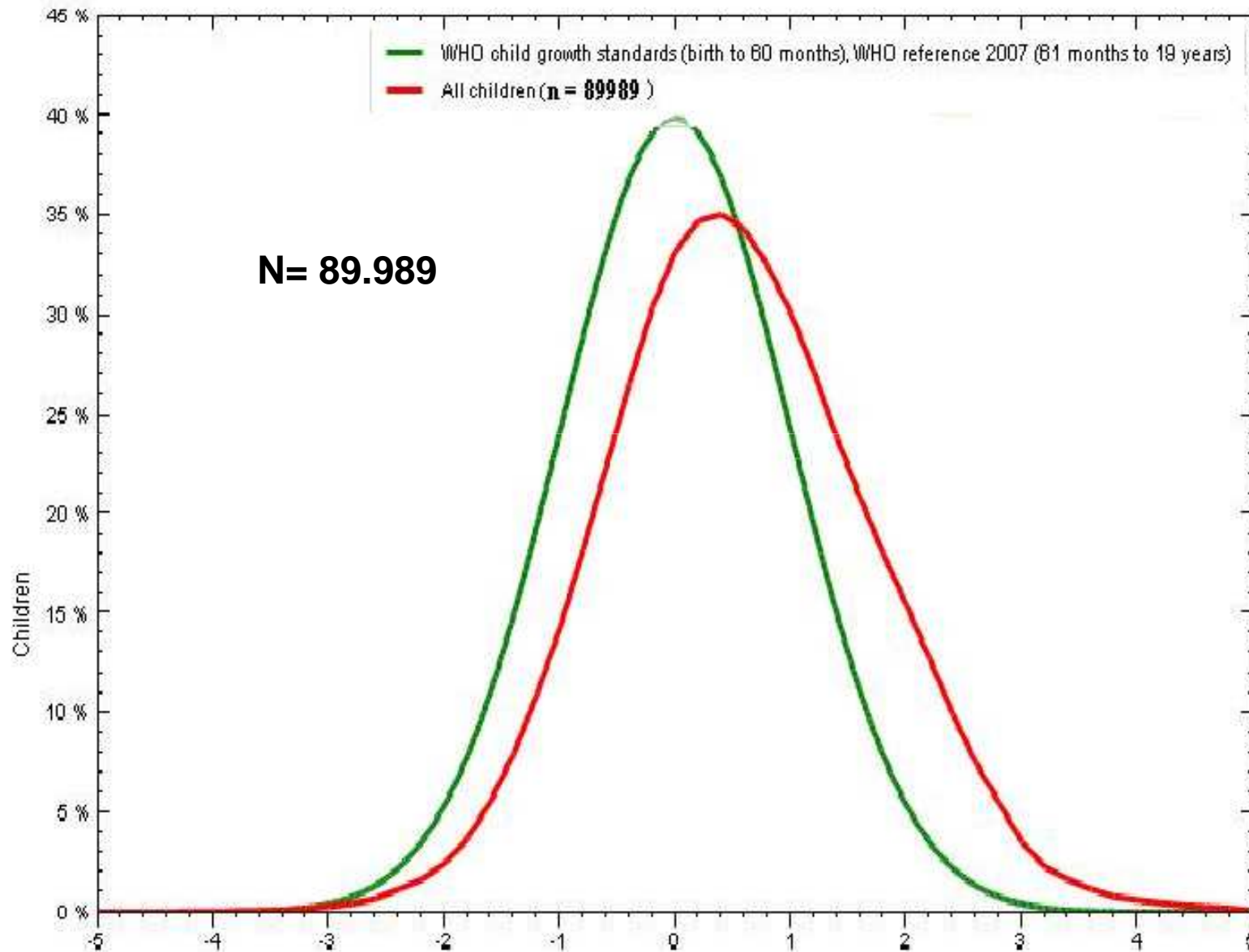
N= 38.002

— WHO standards
— All children (n=38004)

Asturias. All < 15 años Length/Height for age.



Asturias. All < 15 años BMI / for age.

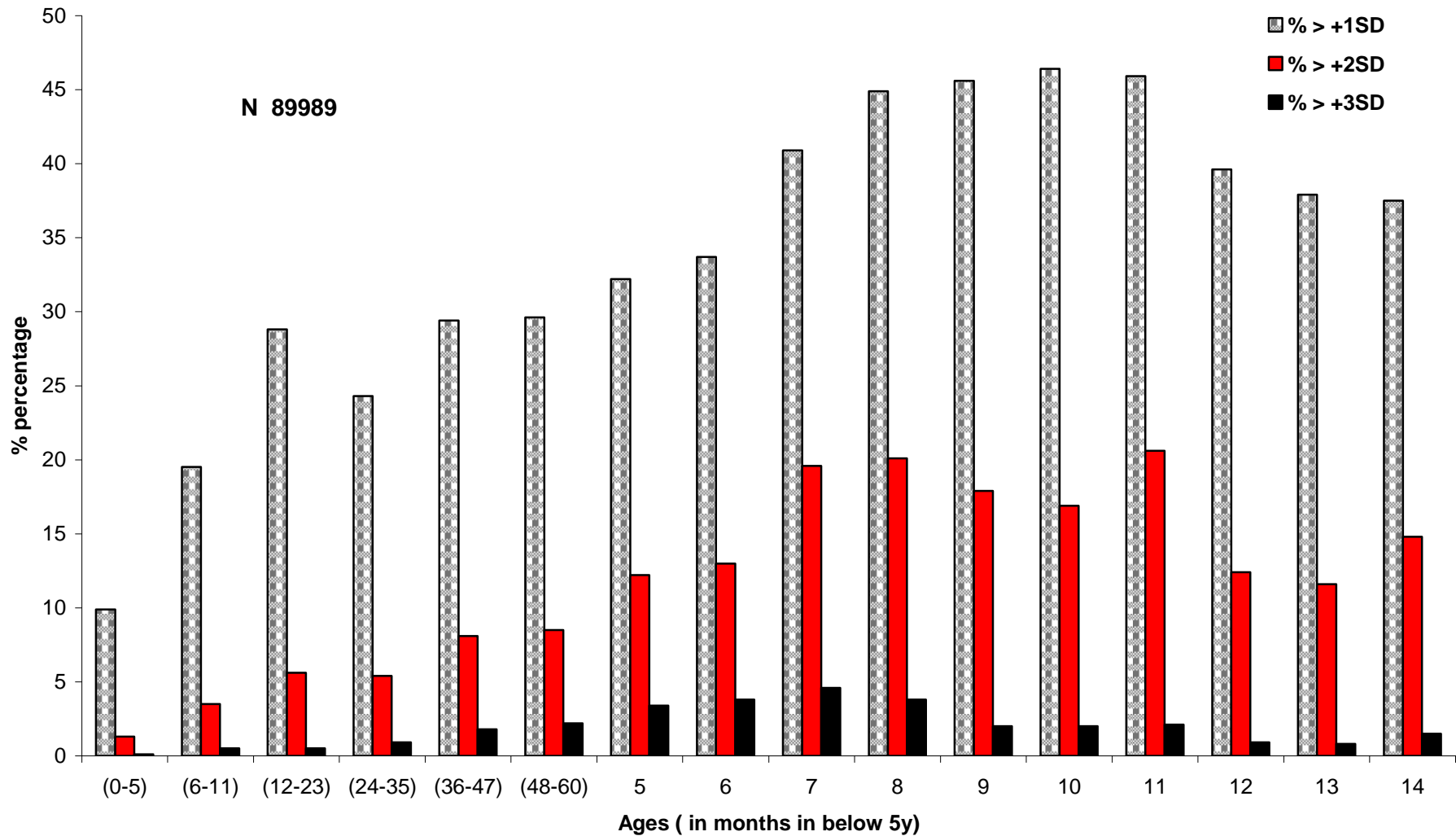


Asturias. BMI. Results by ages

BMI	+1SD	+2SD	+3SD *
0 – 14y	33,3	10,8	1,9
0 - 4 y.	26,0	6,2	1,2
5 – 9y.	37,3	15,1	3,7
10 - 14 y.	41,9	14,5	1,4

* Note : %>+2SD includes %>+3SD; %>+1SD includes %>+2SD and %>+3SD.

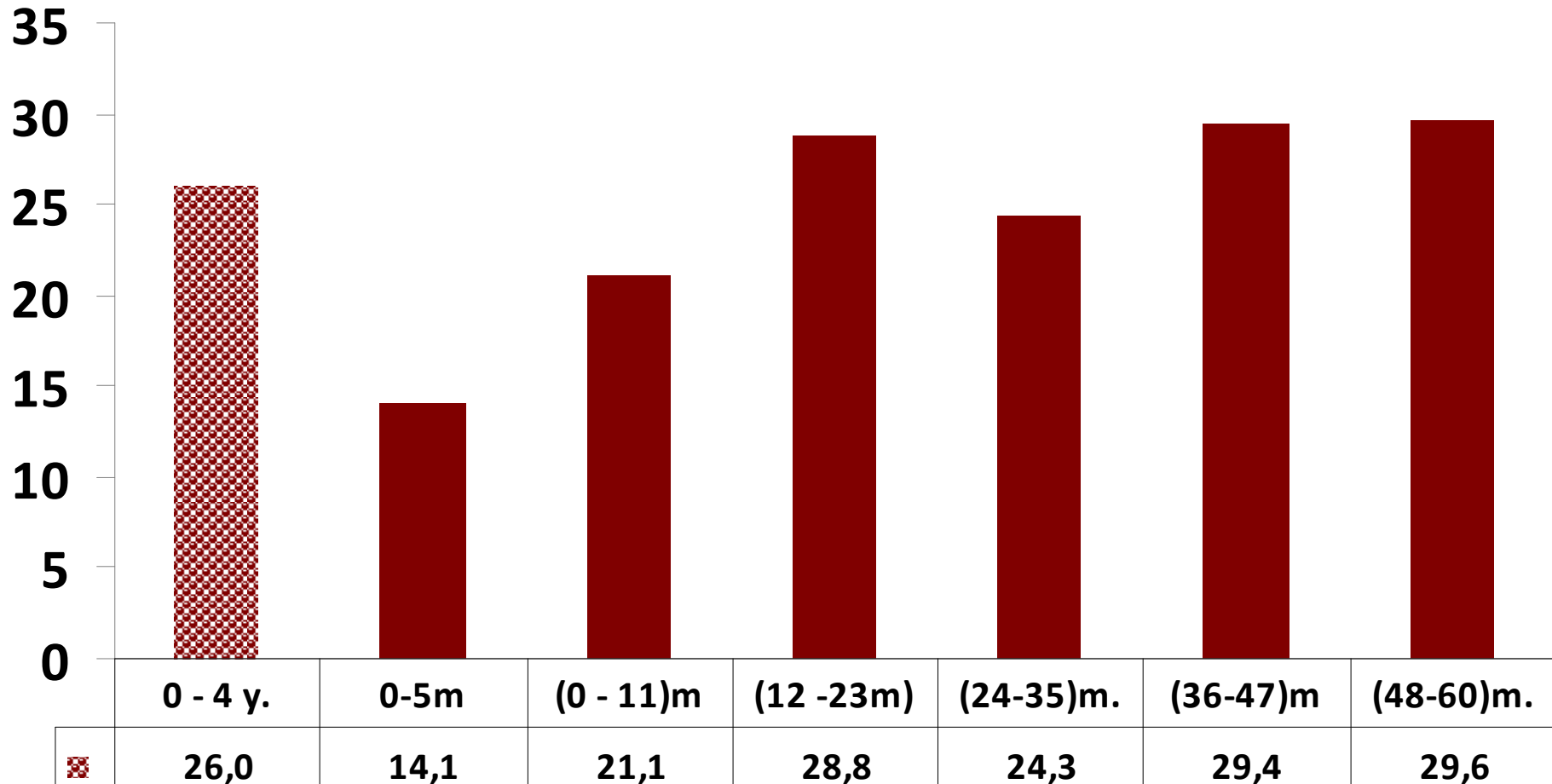
Prevalence of overweight, and obesity by age. Boys and girls combined.



Note. ¹ In children <5 years (60m.) WHO recommends the term overweight for BMI > +2 SD and obesity for BMI > +3 SD to avoid the use of restrictive diets. *M. De Onis & T. Lobstein Defining obesity risk status in the overall childhood population: Which cut-offs should we use? International Journal of Pediatric Obesity, 2010; Early Online, 1-3*

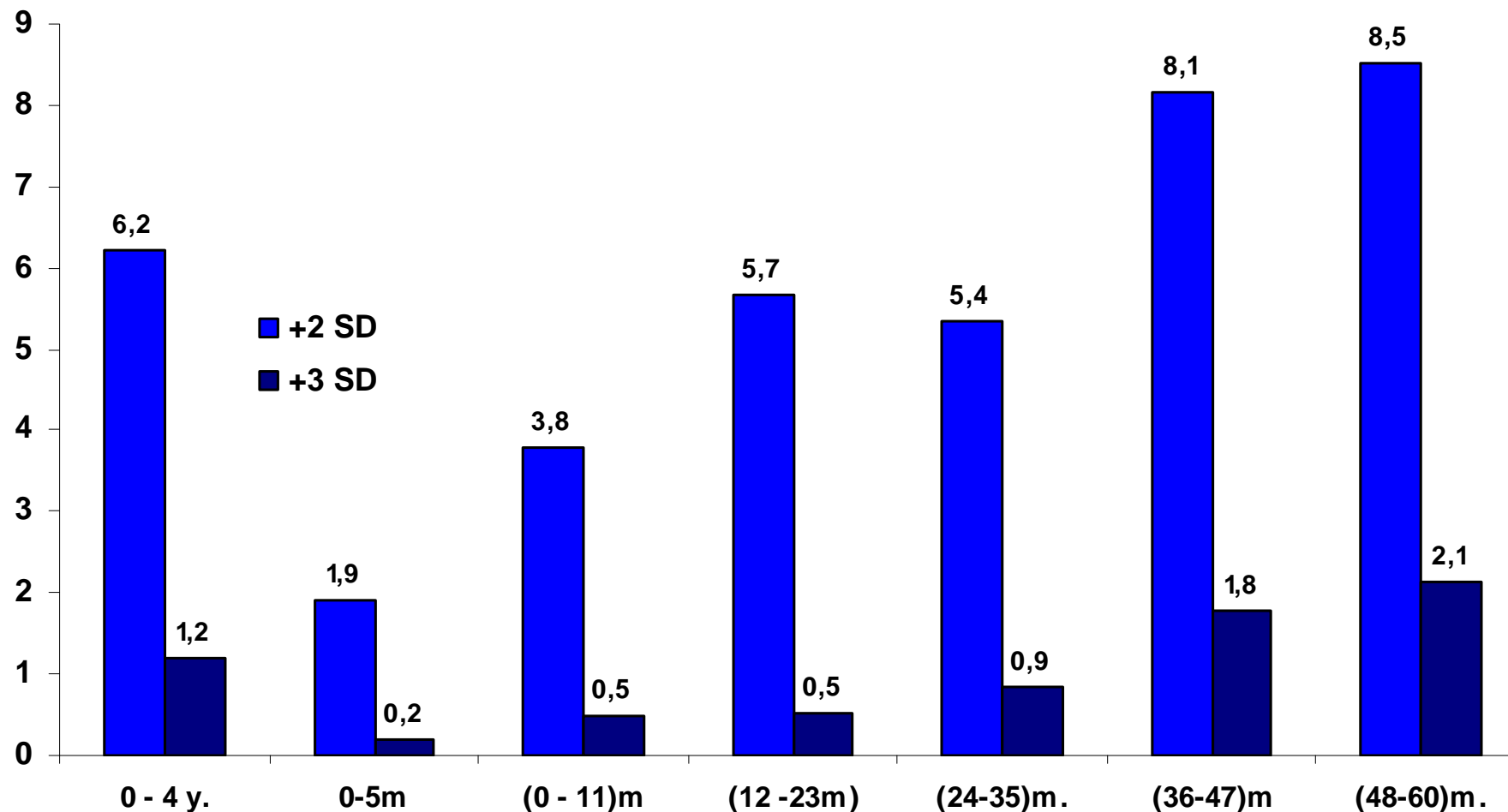
Age group 0-4y. (0-60m)

% BMI > +1 SD



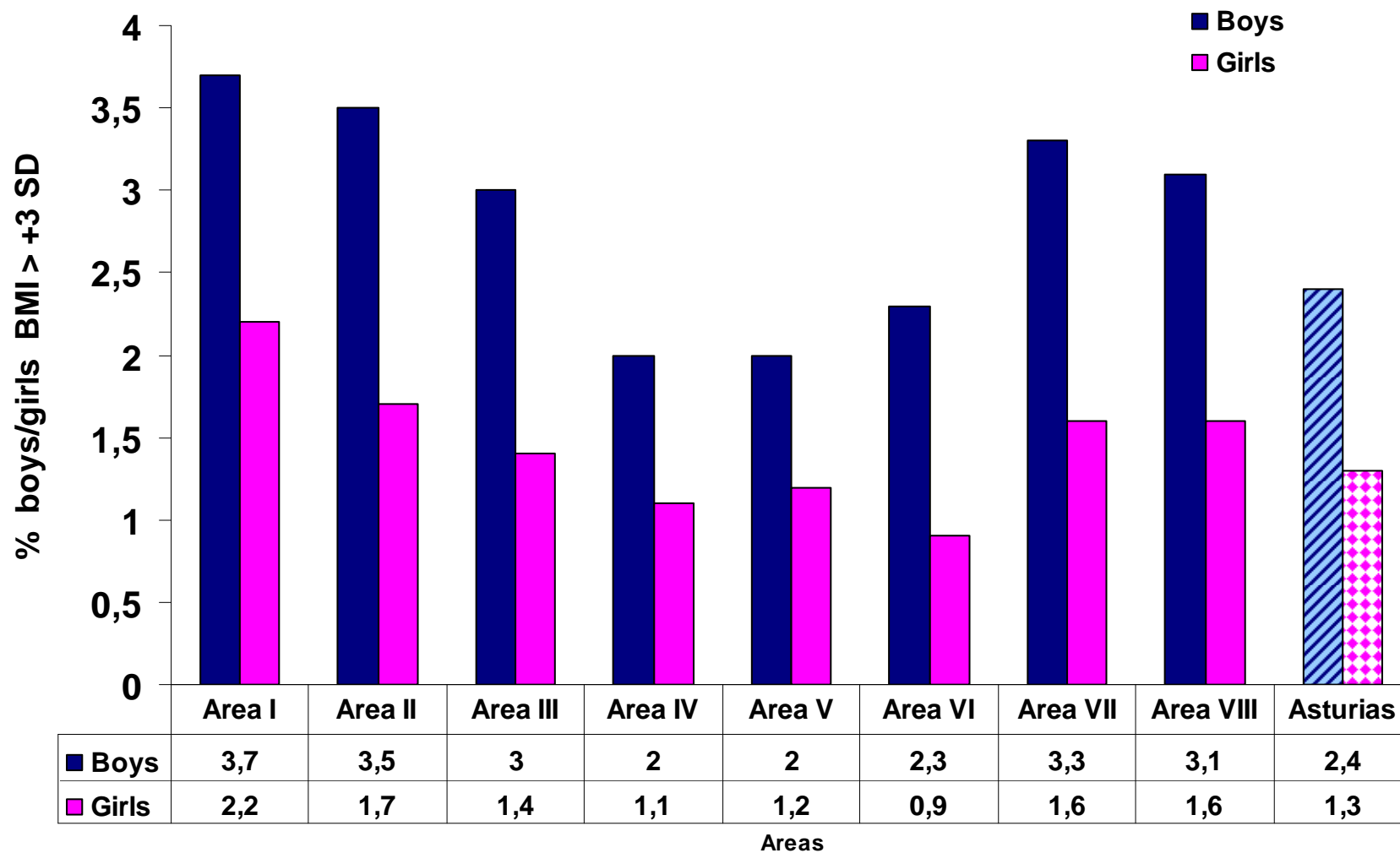
Note. ¹ In children <5 years (60m.) WHO recommends the term at risk of overweight for BMI > +1 SD; overweight for BMI > +2 SD and obesity for BMI > +3 SD to avoid the use of restrictive diets. *M. De Onis & T. Lobstein Defining obesity risk status in the overall childhood population: Which cut-offs should we use? International Journal of Pediatric Obesity, 2010; Early Online, 1-3*

Age group 0-4y. (0-60m) % BMI > +2 SD and +3SD



Note. ¹ In children <5 years (60m.) WHO recommends the term overweight for BMI > +2 SD and obesity for BMI > +3 SD to avoid the use of restrictive diets. *M. De Onis & T. Lobstein Defining obesity risk status in the overall childhood population: Which cut-offs should we use? International Journal of Pediatric Obesity, 2010; Early Online, 1-3*

Severe Obesity (% BMI > +3SD) Boys vs girls (0-14 y) areas & global Asturias



RESULTS
HEALTH AREAS

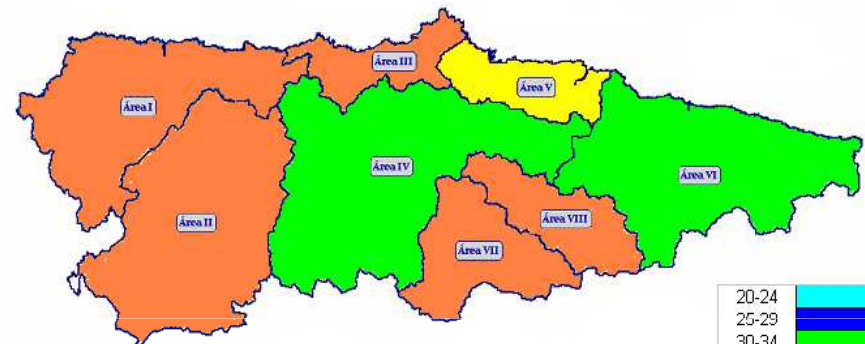
Rates of BMI in areas Adjusted for age and sex

Area	% BMI > +1 SD			%BMI > +2 SD			%BMI > +3 SD		
	0-4	5-9	10-14	0-4	5-9	10-14	0-4	5-9	10-14
I	31.5	41.9	50.1	9.4	18.0	19.6	2.0	5.4	2.6
II	30.5	40.4	43.1	8.4	18.9	17.8	1.5	5.3	2.2
III	29.6	40.5	41.9	7.3	17.3	14.6	1.3	4.3	1.7
IV	24.9	34.0	40.3	5.6	12.8	13.2	1.1	3.0	1.0
V	23.5	37.9	40.3	5.3	15.8	12.6	0.9	3.9	1.2
VI	27.1	32.7	39.9	6.2	12.1	14.9	1.1	3.0	1.1
VII	26.9	40.3	45.9	7.9	18.4	18.3	1.8	4.2	2.1
VIII	28.3	42.0	48.1	7.1	18.2	19.2	1.3	4.6	1.8
Asturias	26	37,2	41,9	6,2	15,1	14,5	1,2	3,7	1,4

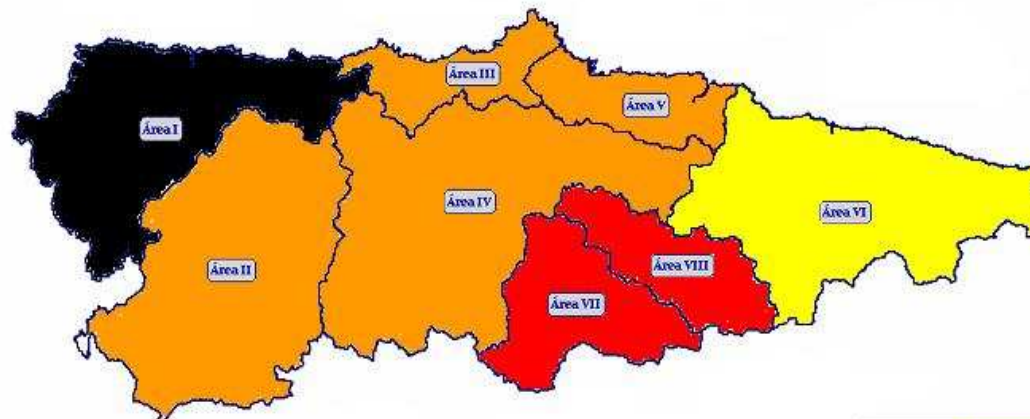
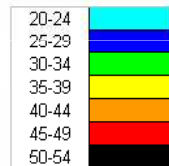
Overweight evolution (BMI % > +1SD) (sex and age adjusted areas)



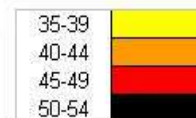
0-60 m (4y.)



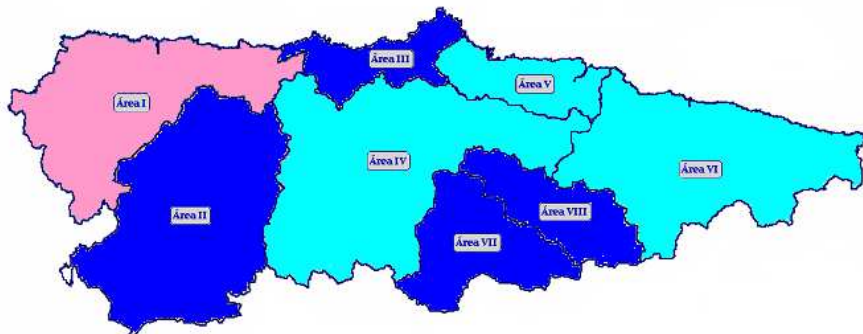
5-9 y.



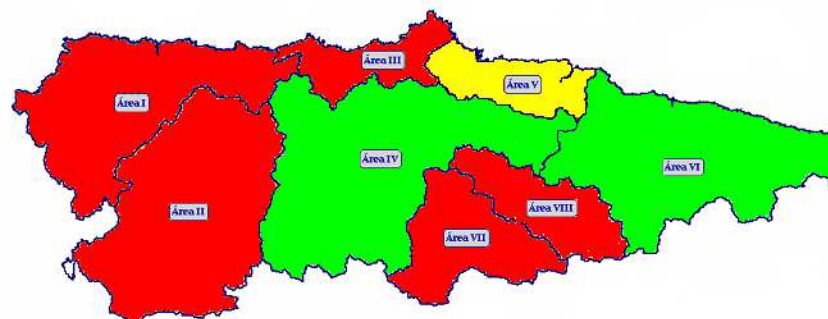
10-14 y.



% BMI > + 2 SD rates in the Areas according age groups



0 - 4 y.



5 - 9 y.



10 - 14 y.



% BMI > + 3 SD rates of obesity in the Areas according age groups

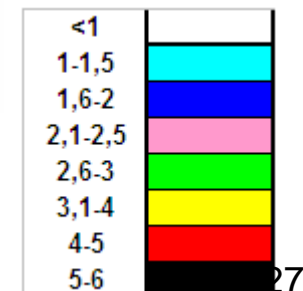


0 - 4 a.

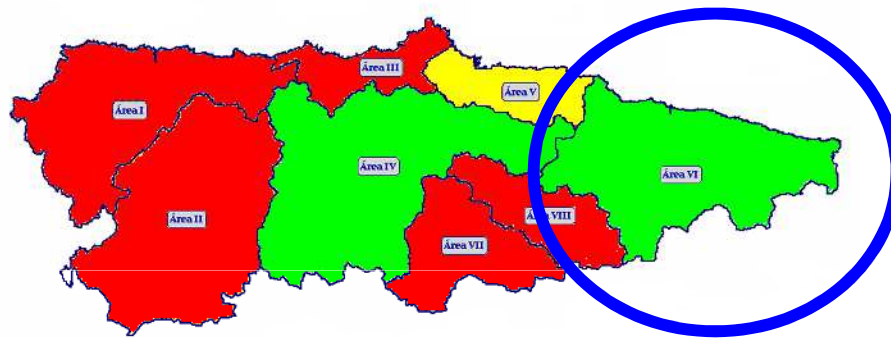
6 - 9 a.



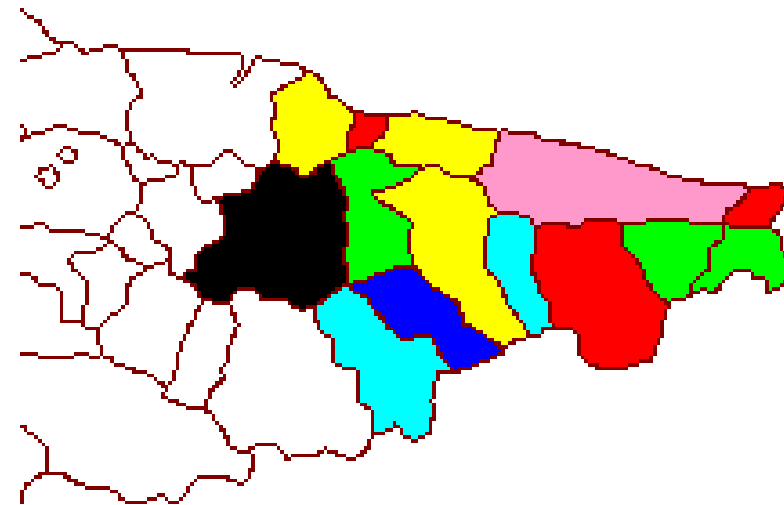
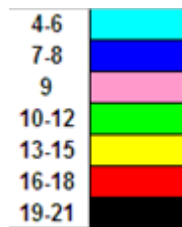
10 -14 a.



% BMI > + 2 SD differences between zones of an area



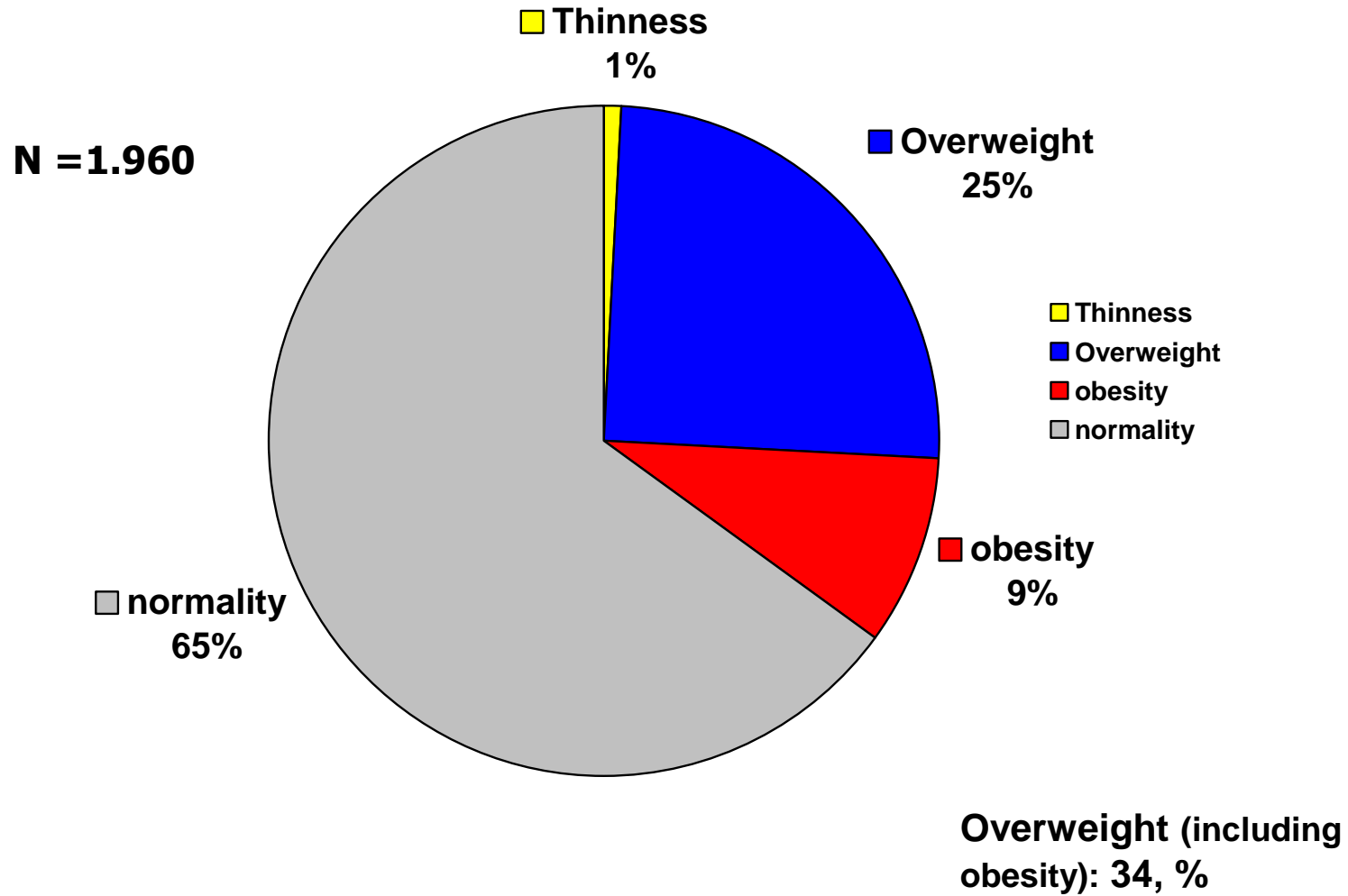
5-9 y.



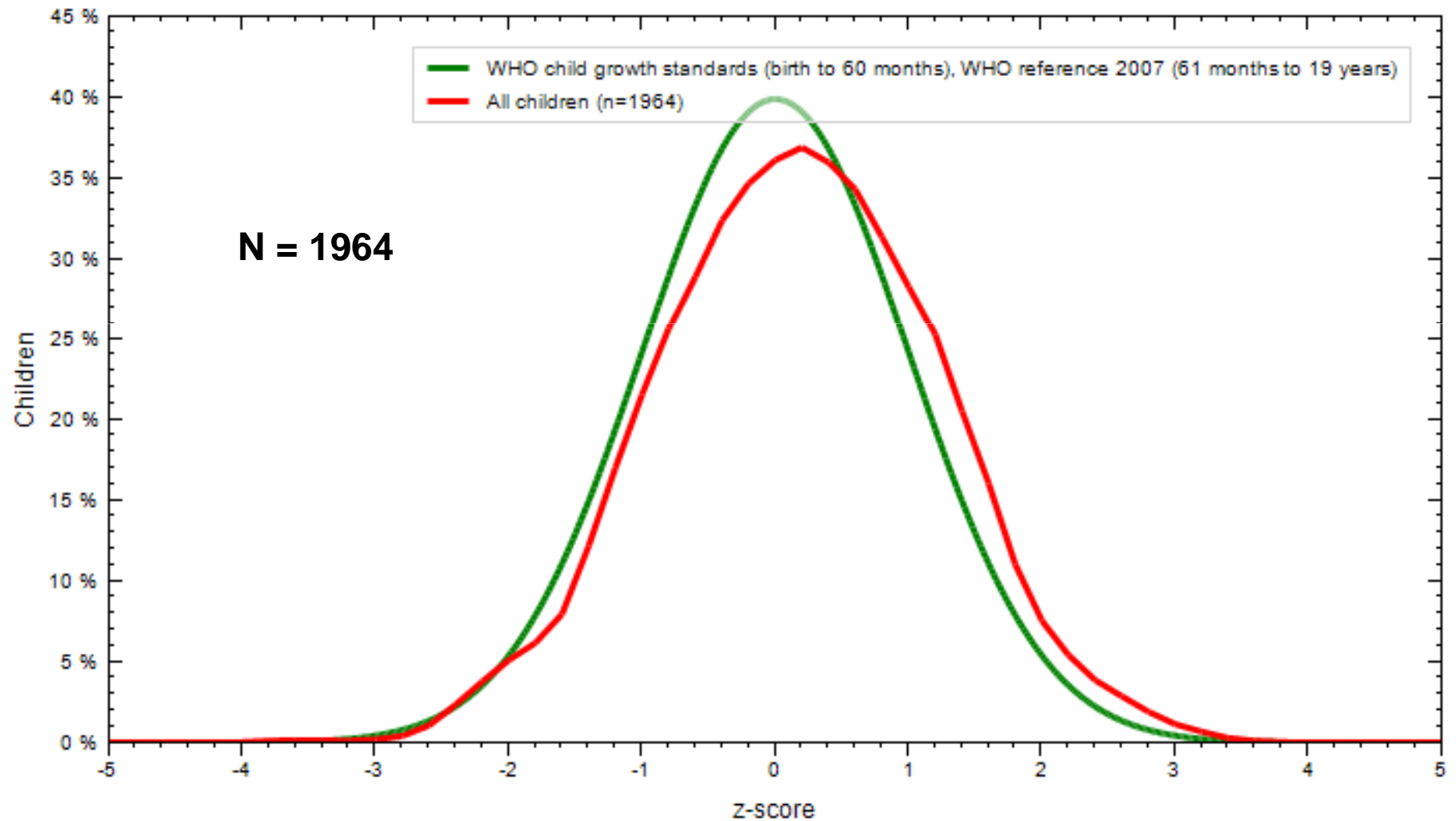
RESULTS

**for the PCP (Primary care
paediatrician)**

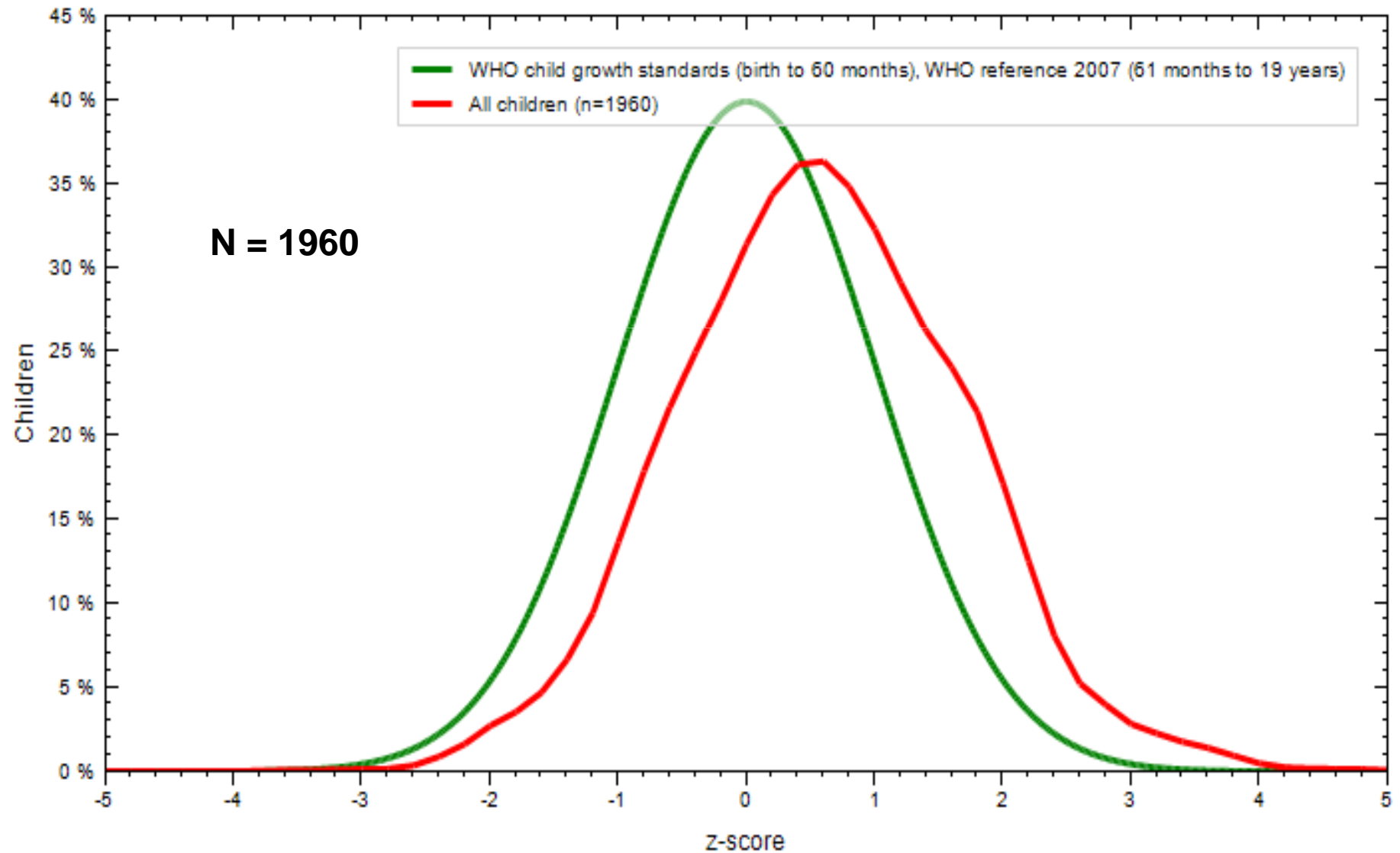
“Otero” Primary care center Results using the BMI



Otero Primary care center Children < 15 years .Height / age.



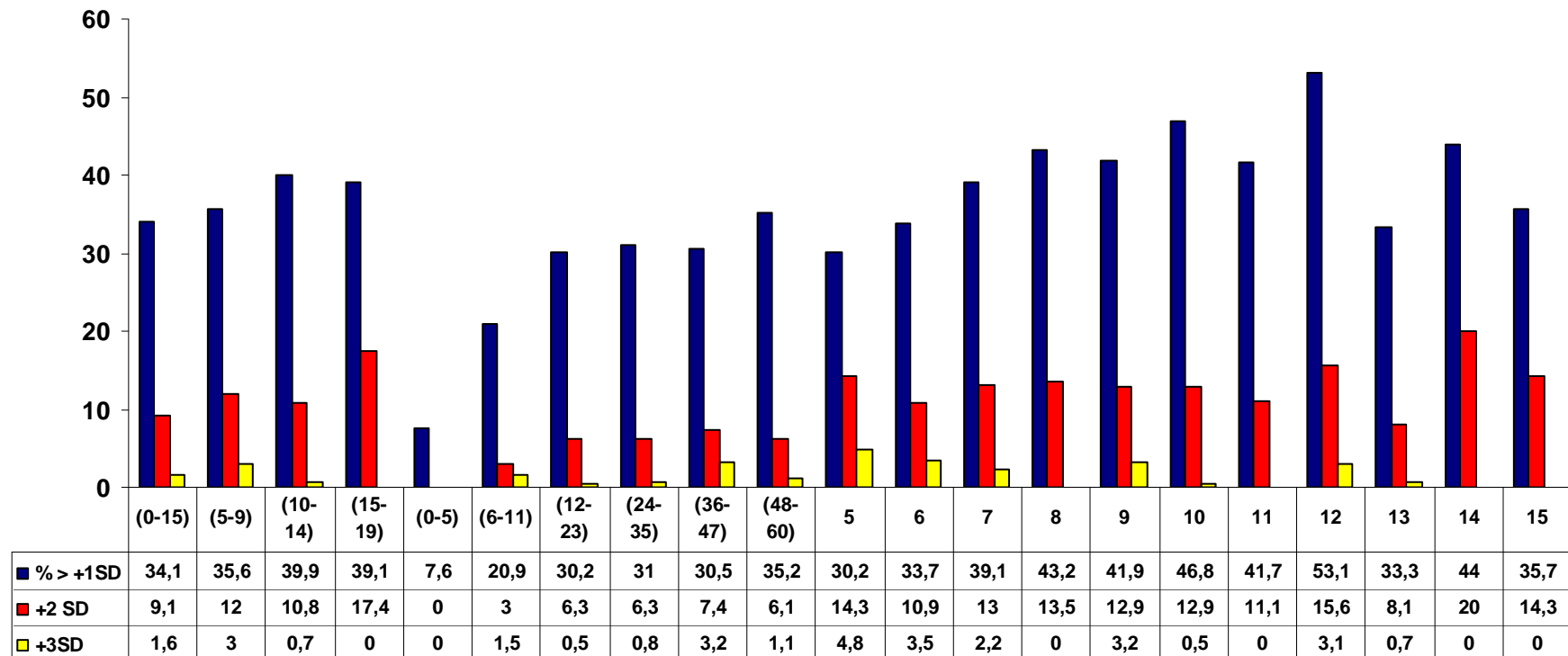
Otero Primary care center Children < 15 years .BMI / age.



Otero Primary care center

Children < 15 years (sexes combined)

% BMI +1,+2 y +3 SD



local survey results in age group 0-60 m.

Country:	España								
Reference:	Asturias								
Administrative level:	Area VII	(subregional)	FIGAREDO & UJO						
Month and year of survey:	2010-2012								

Set 1: Sexes combined

Age groups	N	Weight-for-age %				Length/height-for-age %			
		% < -3SD	% < -2SD	Mean	SD	% < -3SD	% < -2SD	Mean	SD
Total (0-60)	257	0,4	1,9	0,25	1,19	0,4	2,4	0,07	1,14
(0-5)	25	0	4	-0,42	1,04	0	12	-0,57	1,13
(6-11)	23	0	4,3	0,09	0,95	0	4,3	0,05	0,9
(12-23)	59	1,7	1,7	0,62	1,34	1,7	1,7	0,31	1,35
(24-35)	43	0	0	0,54	1,22	0	0	0,37	1,15
(36-47)	50	0	0	0,07	0,99	0	2	-0,16	1
(48-60)	57	0	3,5	0,16	1,16	0	0	0,09	0,99

Set 2: Males

Age groups	N	Weight-for-age %				Length/height-for-age %			
		% < -3SD	% < -2SD	Mean	SD	% < -3SD	% < -2SD	Mean	SD
Total (0-60)	133	0	2,3	0,18	1,13	0	3,8	-0,01	1,14
(0-5)	14	0	7,1	-0,23	1,21	0	21,4	-0,6	1,32
(6-11)	13	0	7,7	-0,26	0,94	0	7,7	-0,15	1,11
(12-23)	31	0	0	0,49	1,03	0	0	0,12	1,01
(24-35)	21	0	0	0,56	1,24	0	0	0,35	1,31
(36-47)	22	0	0	-0,03	1,07	0	4,3	-0,18	1,1
(48-60)	32	0	3,1	0,12	1,15	0	0	0,11	1,09

Set 3: Females

Age groups	N	Weight-for-age %				Length/height-for-age %			
		% < -3SD	% < -2SD	Mean	SD	% < -3SD	% < -2SD	Mean	SD
Total (0-60)	124	0,8	1,6	0,33	1,24	0,8	0,8	0,14	1,13
(0-5)	11	0	0	-0,66	0,76	0	0	-0,52	0,88
(6-11)	10	0	0	0,55	0,8	0	0	0,31	0,43
(12-23)	28	3,6	3,6	0,76	1,61	3,6	3,6	0,51	1,63
(24-35)	22	0	0	0,51	1,22	0	0	0,39	1,03
(36-47)	28	0	0	0,15	0,94	0	0	-0,15	0,93
(48-60)	25	0	4	0,22	1,2	0	0	0,07	0,87

Local survey results in age group 0-60 m. Weight/Height

Country:	España							
Reference:	Asturias							
Administrative level:	Area VII	(subregional)	FIGAREDO & UJO					
Month and year of survey:	2010-2012							

Set 1: Sexes combined

Age groups	N	Weight-for-length/height %					Mean	SD
		% < -3SD	% < -2SD	% > +1SD	% > +2SD	% > +3SD		
Total (0-60)	257	0,4	2	27,5	8,6	1,6	0,31	1,2
(0-5)	25	0	0	24	0	0	0,06	0,95
(6-11)	23	0	0	17,4	4,3	0	0,16	0,92
(12-23)	59	1,7	3,3	36,7	13,3	0	0,55	1,39
(24-35)	43	0	0	30	12,5	5	0,53	1,2
(36-47)	50	0	0	22	8	2	0,25	1,1
(48-60)	57	0	5,3	26,3	7	1,8	0,14	1,24

Set 2: Males

Age groups	N	Weight-for-length/height %					Mean	SD
		% < -3SD	% < -2SD	% > +1SD	% > +2SD	% > +3SD		
Total (0-60)	133	0,8	1,5	24,4	7,6	2,3	0,27	1,17
(0-5)	14	0	0	35,7	0	0	0,4	1,03
(6-11)	13	0	0	0	0	0	-0,15	0,73
(12-23)	31	3,1	3,1	28,1	12,5	0	0,42	1,38
(24-35)	21	0	0	33,3	11,1	11,1	0,73	1,16
(36-47)	22	0	0	27,3	9,1	0	0,15	1,14
(48-60)	32	0	3,1	18,8	6,3	3,1	0,05	1,12

Set 3: Females

Age groups	N	Weight-for-length/height %					Mean	SD
		% < -3SD	% < -2SD	% > +1SD	% > +2SD	% > +3SD		
Total (0-60)	124	0	2,4	30,6	9,7	0,8	0,36	1,24
(0-5)	11	0	0	9,1	0	0	-0,37	0,63
(6-11)	10	0	0	40	10	0	0,57	1,02
(12-23)	28	0	3,6	46,4	14,3	0	0,69	1,42
(24-35)	22	0	0	27,3	13,6	0	0,37	1,23
(36-47)	28	0	0	17,9	7,1	3,6	0,33	1,09
(48-60)	25	0	8	36	8	0	0,25	1,4

Local survey results in age group 0-60 m. BMI /Age

Country:	España							
Reference:	Asturias							
Administrative level:	Area VII	(subregional)						
Month and year of survey:	2010-2012							

Set 1: Sexes combined

Age groups	N	BMI-for-age					Mean	SD
		% < -3SD	% < -2SD	% > +1SD	% > +2SD	% > +3SD		
Total (0-60)	257	0	2	26,4	7,9	1,2	0,31	1,16
(0-5)	25	0	4	8	0	0	-0,16	1
(6-11)	23	0	0	17,4	4,3	0	0,09	0,94
(12-23)	59	0	1,7	35,6	11,9	0	0,64	1,16
(24-35)	43	0	0	32,5	10	2,5	0,53	1,19
(36-47)	50	0	0	24	8	2	0,26	1,13
(48-60)	57	0	5,3	26,3	7	1,8	0,16	1,25

Set 2: Males

Age groups	N	BMI-for-age					Mean	SD
		% < -3SD	% < -2SD	% > +1SD	% > +2SD	% > +3SD		
Total (0-60)	133	0	1,5	23,1	6,9	1,5	0,28	1,1
(0-5)	14	0	7,1	14,3	0	0	0,16	1,12
(6-11)	13	0	0	0	0	0	-0,22	0,75
(12-23)	31	0	0	29	9,7	0	0,6	0,98
(24-35)	21	0	0	38,9	11,1	5,6	0,7	1,13
(36-47)	22	0	0	27,3	9,1	0	0,16	1,17
(48-60)	32	0	3,1	18,8	6,3	3,1	0,08	1,16

Set 3: Females

Age groups	N	BMI-for-age					Mean	SD
		% < -3SD	% < -2SD	% > +1SD	% > +2SD	% > +3SD		
Total (0-60)	124	0	2,4	29,8	8,9	0,8	0,34	1,24
(0-5)	11	0	0	0	0	0	-0,55	0,67
(6-11)	10	0	0	40	10	0	0,5	1,05
(12-23)	28	0	3,6	42,9	14,3	0	0,69	1,34
(24-35)	22	0	0	27,3	9,1	0	0,38	1,25
(36-47)	28	0	0	21,4	7,1	3,6	0,34	1,11
(48-60)	25	0	8	36	8	0	0,26	1,38

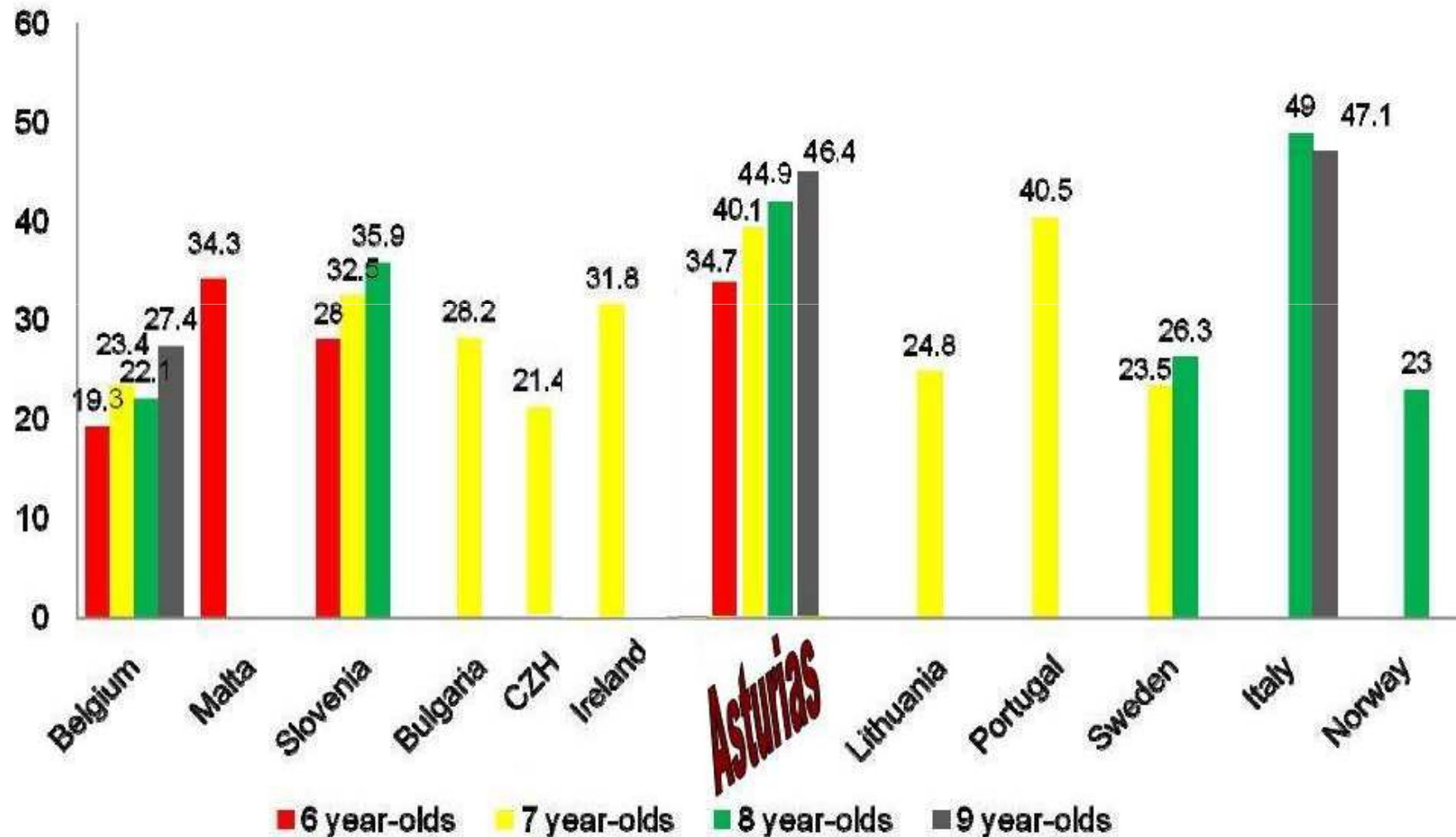
Otero PCP center.

Information about each item of the survey

	A	B	Barra de fórmulas		E	F	G	H	I	J	K	L	M
1	Survey date	Nº ID	Sex	Date of birth	Age (m)	Weight (kg)	Height (cm)	WAZ	HAZ	BAZ	Flag	AREA	CodCentr
1869	22/03/2012	41437	male	21/09/2011	6,01	7,6	67	-0,4	-0,3	-0,29		4	5040510
1870	23/03/2012	41438	female	22/09/2011	6,01	7,5	69	0,22	1,43	-0,79		4	5040510
1871	19/03/2012	41442	female	18/09/2011	6,01	7,75	68	0,49	0,99	-0,1		4	5040510
1872	28/03/2012	41443	female	26/09/2011	6,05	6,9	66	-0,48	0,09	-0,73		4	5040510
1873	28/03/2012	41444	female	25/09/2011	6,08	6,95	61	-0,43	-2,11	1,09		4	5040510
1874	28/03/2012	41448	female	28/09/2011	5,98	9,05	70	1,76	1,9	0,97		4	5040510
1875	25/10/2011	41449	male	25/08/2011	2	4,25	56	-2,13	-1,22	-2,12		4	5040510
1876	28/03/2012	41450	male	30/09/2011	5,91	9,9	72	2,09	2,11	1,16		4	5040510
1877	09/04/2012	41452	male	08/10/2011	6,05	8	70	0,06	1,08	-0,74		4	5040510
1878	16/04/2012	41453	male	06/10/2011	6,34	8,9	69	0,91	0,39	0,9		4	5040510
1879	21/11/2011	41454	female	16/05/2010	18,2	9	76	-1,09	-1,69	-0,1		4	5040510
1880	10/04/2012	41455	male	10/10/2011	6,01	7,1	66	-1,01	-0,77	-0,76		4	5040510
1881	16/02/2012	41458	female	15/10/2011	4,07	6,4	61	-0,08	-0,57	0,33		4	5040510
1882	25/10/2011	41459	female	10/10/2011	0,49	3,95	54,5	0,64	1,49	-0,17		4	5040510
1883	25/10/2011	41462	male	02/08/1997	170,74	46,5	157		-0,99	-0,14		4	5040510
1884	12/03/2012	41463	female	03/01/2011	14,26	10,5	78	0,85	0,49	0,8		4	5040510
1885	28/12/2011	41465	male	27/10/2011	2,04	4,65	56	-1,48	-1,27	-1,12		4	5040510
1886	06/03/2012	41471	male	03/11/2011	4,07	7,5	66,5	0,56	1,18	-0,15		4	5040510
1887	12/03/2012	41475	female	11/11/2011	4,01	6,25	62	-0,23	-0,05	-0,27		4	5040510
1888	13/03/2012	41477	male	13/11/2011	3,98	7,3	65	0,39	0,56	0,09		4	5040510
1889	12/03/2012	41478	female	10/11/2011	4,04	5,55	60	-1,21	-1	-0,86		4	5040510
1890	06/03/2012	41479	female	30/07/2008	43,2	15	97	-0,1	-0,68	0,46		4	5040510
1891	17/02/2012	41483	male	19/08/2010	17,97	12,3	89	1,06	2,51	-0,5		4	5040510
1892	20/03/2012	41484	female	20/11/2011	3,98	5,85	62,5	-0,74	0,21	-1,17		4	5040510
1893	21/03/2012	41485	male	21/11/2011	3,98	7,2	64	0,26	0,08	0,29		4	5040510
1894	26/03/2012	41486	female	25/11/2011	4,01	7,1	61,5	0,8	-0,28	1,29		4	5040510
1895	26/03/2012	41487	female	25/11/2011	4,01	6,25	63	-0,23	0,41	-0,62		4	5040510
1896	11/01/2012	41488	female	07/10/2010	15,15	9,3	79	-0,29	0,48	-0,82		4	5040510
1897	01/02/2012	41490	female	19/01/2008	48,43	22	109	2,11	1,39	1,99		4	5040510
1898	02/04/2012	41491	female	23/11/2011	4,3	5,35	58	-1,68	-2,16	-0,56		4	5040510
1899	13/04/2012	41492	female	10/12/2011	4,11	6,7	66	0,27	1,7	-0,9		4	5040510
1900	12/04/2012	41493	female	11/12/2011	4,04	6,5	59,5	0,07	-1,23	1,05		4	5040510
1901	20/02/2012	41497	male	12/12/2011	2,3	5,5	60	-0,48	0,3	-0,93		4	5040510
1902	30/12/2011	41498	male	15/12/2011	0,49	3,4	50,5	-0,77	-1,04	-0,3		4	5040510
1903	27/01/2012	41500	female	20/12/2011	1,25	3,9	51,5	0,97	0,05	1,35		4	5040510

Compared with Cosi results. Prevalence of overweight, incl.obesity – boys %

Based on the 2007 WHO growth reference for children and adolescents 5-19 years



CONCLUSIONES

- **Electronic recording** of clinical information (OMI-AP) is useful for the study of the prevalence of childhood obesity and other developmental disorders.
- Widespread use and high attendance rates to check up programs **guarantee the validity of the results.**
- The **10.8%** of children under 14 years have higher BMI values than the cut off point for **obesity** and another **22.5%** for **overweight.**
- The **prevalence of obesity** in children under 5 years is similar in both sexes while in the age group 5-14 years, **boys have higher rates.**

CONCLUSIONS

- There are problems with overweight and obesity beginning in the second year of life.
- We found significant differences in levels of obesity within the areas and basic zones.
- Areas IV and V are those with lower rates of overweight and obesity.
- This research will allow the professionals to design adjusted interventions on the needs of their patients at local level. All children will have calculated their anthropometric Z score and this can be used to measure and evaluate the effectiveness of interventions.


CONCLUSIONS II

- This study has been done in a different autonomous region and this will allow us to study and share results .
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Nutritional survey in a spanish autonomous region: thinness, overweight and obesity in children attended in primary care centers.

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Thank you very much



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