XIV Congreso Internacional de Auxología
«Por un crecimiento saludable en un mundo mejor»

CRECIMIENTO EN PAÍSES LATINOAMERICANOS: SIMILITUDES Y DIFERENCIAS

Growth variations and secular trend in Argentina

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Background

In 2006, the WHO published a normative tool for growth assessment in children aged 0–5 years, which would require control of the environmental conditions under which optimal child growth was expected.

The feasibility of developing a single growth standard in schoolchildren and adolescents has been largely debated. In 2007, WHO published growth references for boys and girls aged 5–19 years.

To what extent is the WHO reference for boys and girls aged 5–19 years suitable for assessing children and adolescents from other populations outside the US?

If available, national growth standards may be more appropriate to assess growth deviations and abnormal growth. Also, they may serve as the baseline to evaluate secular changes.

The Argentinian Growth Reference

- The Argentinian Society of Pediatrics (SAP) and the Ministry of Health have agreed their use since 1987. Constructed on:
  - ✓ Longitudinal (< 3 y) and cross-sectional data (4–12 y) collected between 1960 and 1970 in two cities: La Plata and Córdoba
  - ✓ Cross-sectional data (12 – 18 y) collected in 1985 in adolescents from all over the country

- In 2009, weight and height percentiles were adjusted by the LMS method, including WHO 2006 data reference for children < 2 y (Lejarraga et al., 2009)

Rferences: Cusminsky et al. (1974), Funes Lastra et al. (1975), Lejarraga et al. (1986), Lejarraga and Orfila (1987) Lejarraga et al. (2009)

Objectives

- To describe inter-population variations in physical growth
  - ✓ Comparison with WHO growth reference – current sample of Argentinian boys and girls

- To evaluate secular changes in height and weight in Argentina over the last three decades
  - ✓ Comparison with Argentinian (ARG) growth reference – current sample of Argentinian boys and girls

  These comparisons quoted are aimed at contributing information to the more general issue on the usefulness of either national or international references for the assessment of growth in children and adolescents from developing countries.

- To measure changes in overweight and obesity 1990-2016

Subjects and methods

Three cross-sectional surveys were conducted in **Santa Rosa** (**SR**, La Pampa, Northern Patagonia)

(1) **SR2007** (n=4,366, 5-15 y, year 2005/07)

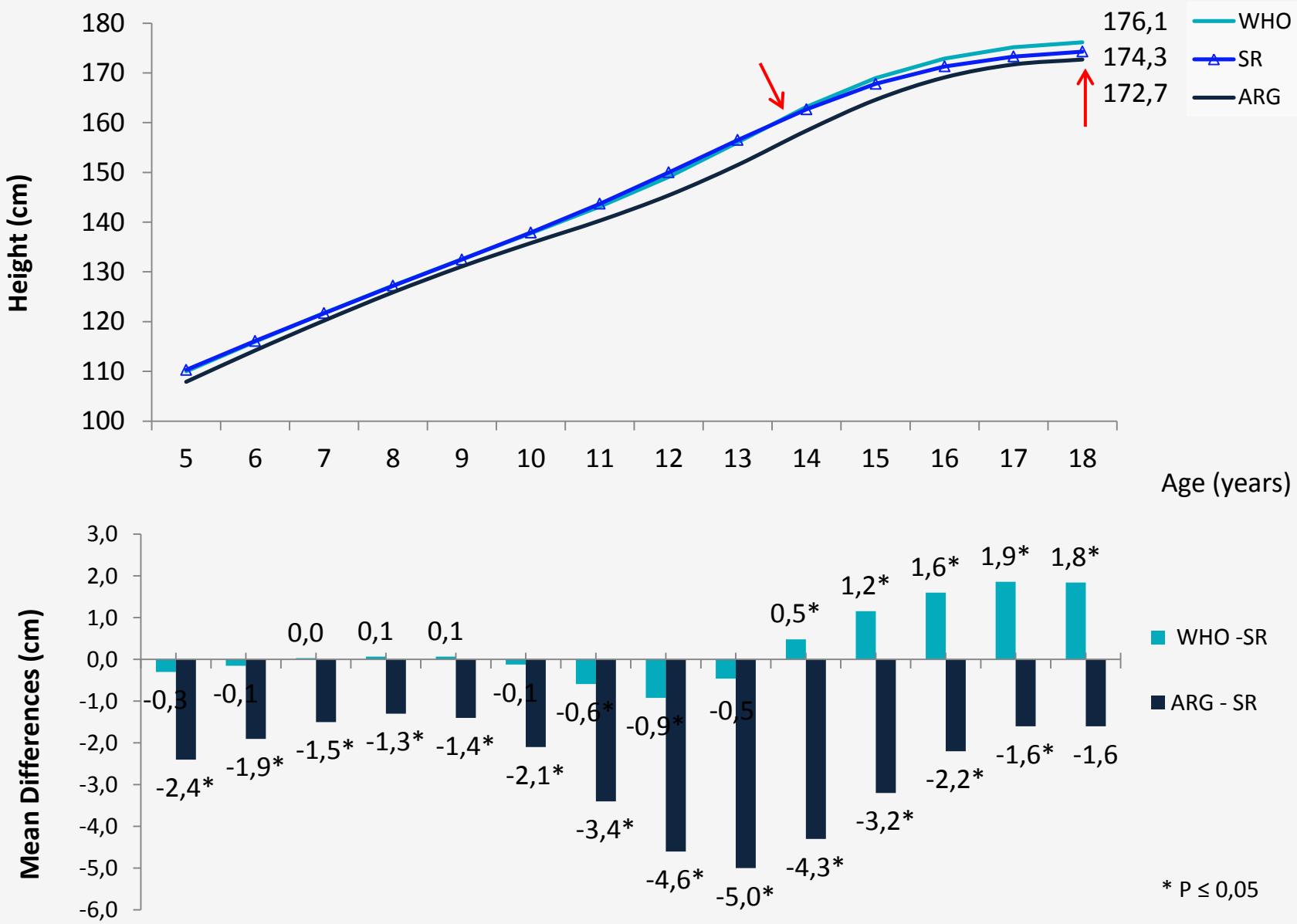
(2) **SR2009** (n=1965, 12-18 y, year 2009)

(3) **SR2016** (n=1,367, 6-12 y, year 2015/16)

- Weight and height centiles were calculated on a probabilistic sample of 6,240 schoolchildren aged 5 -18 y (**SR2007** and **SR2009**) and compared with WHO and ARG references
- Changes in overweight and obesity (IOTF grade) in children < 12y were assessed by comparing School Health records from 1990 (n=1,649) with **SR2007** and **SR2016**
- Signification level was set at $p < 0.05$

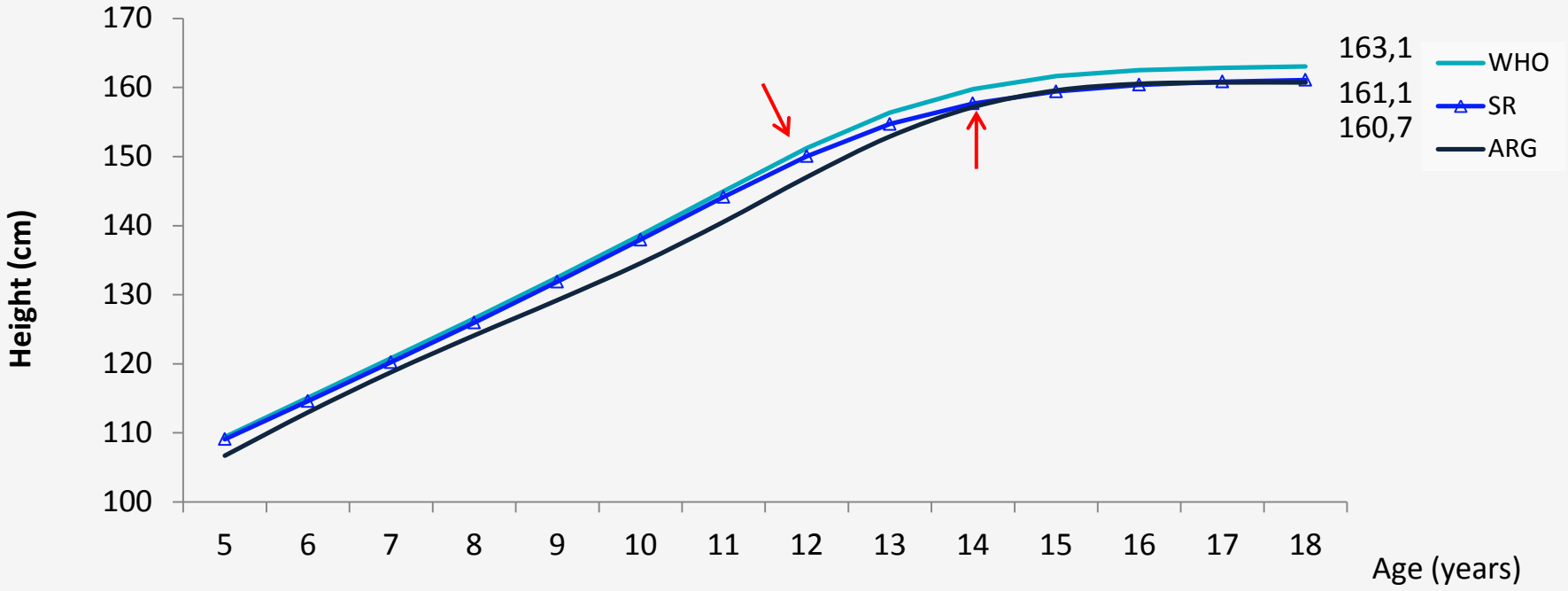
References: Cole and Green (1992), Pan and Cole (2010), Cole et. al (2000; 2007)

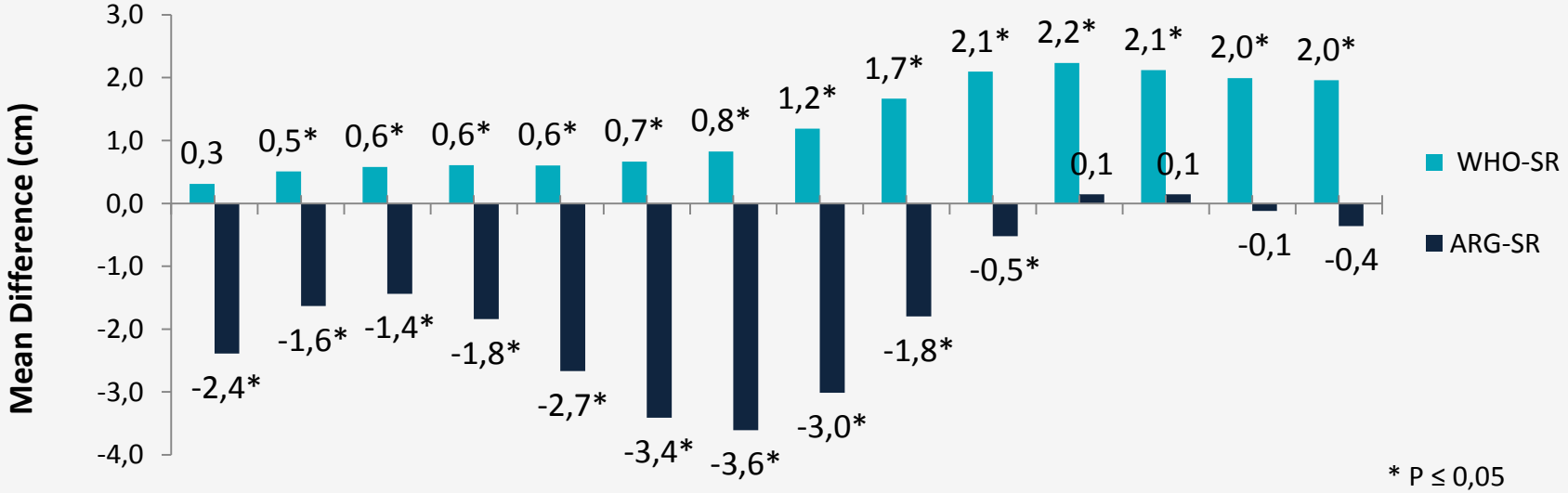
Height variations (boys)



Reference: Orden and Apezteguía (2016)

Height variations (girls)

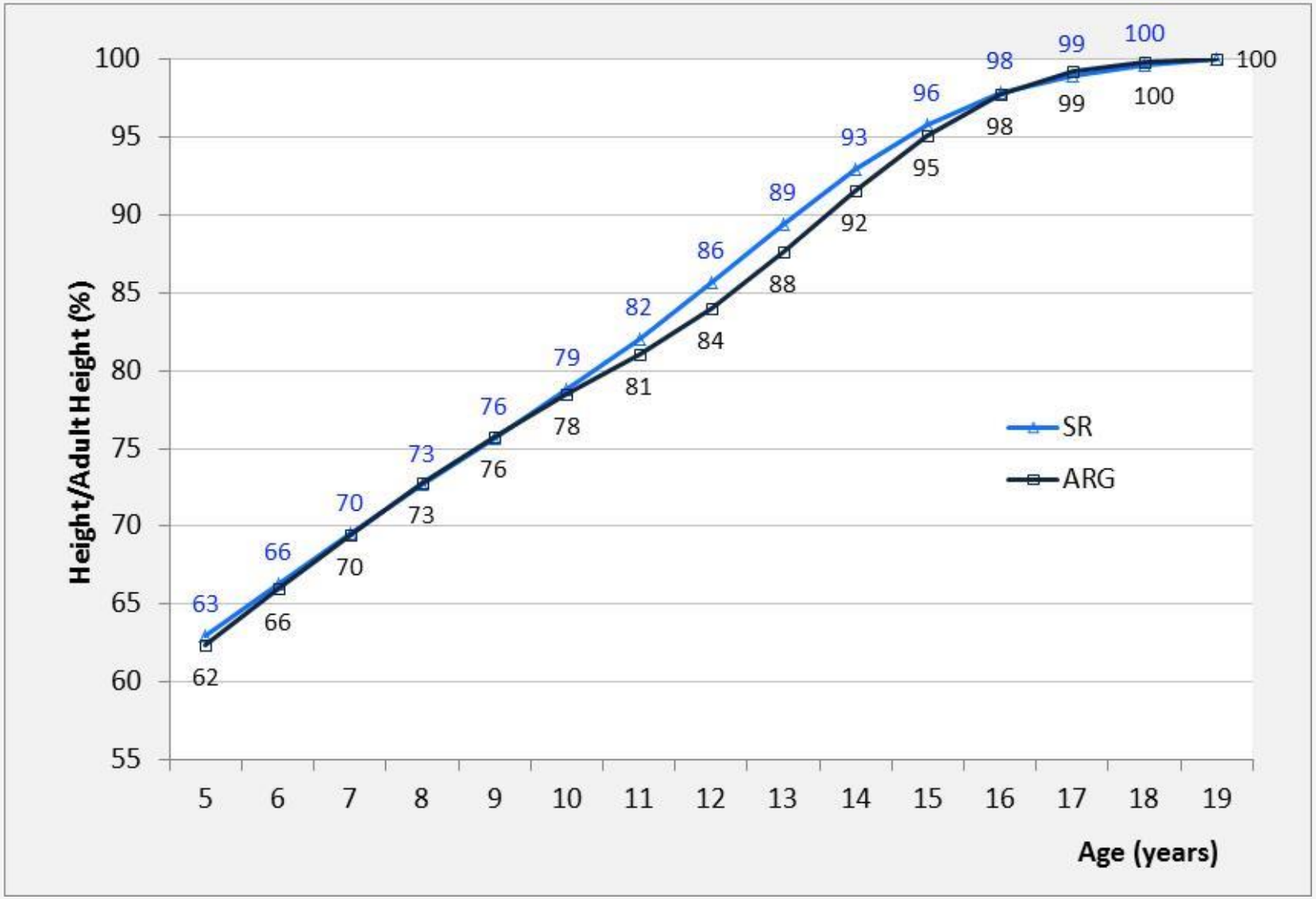




* P ≤ 0,05

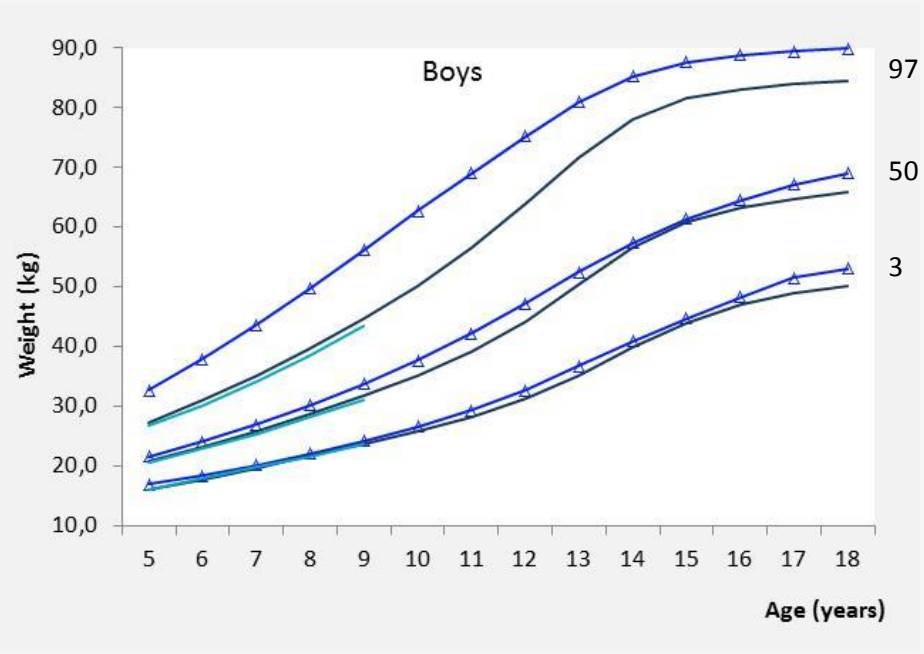
Reference: Orden and Apezteguía (2016)

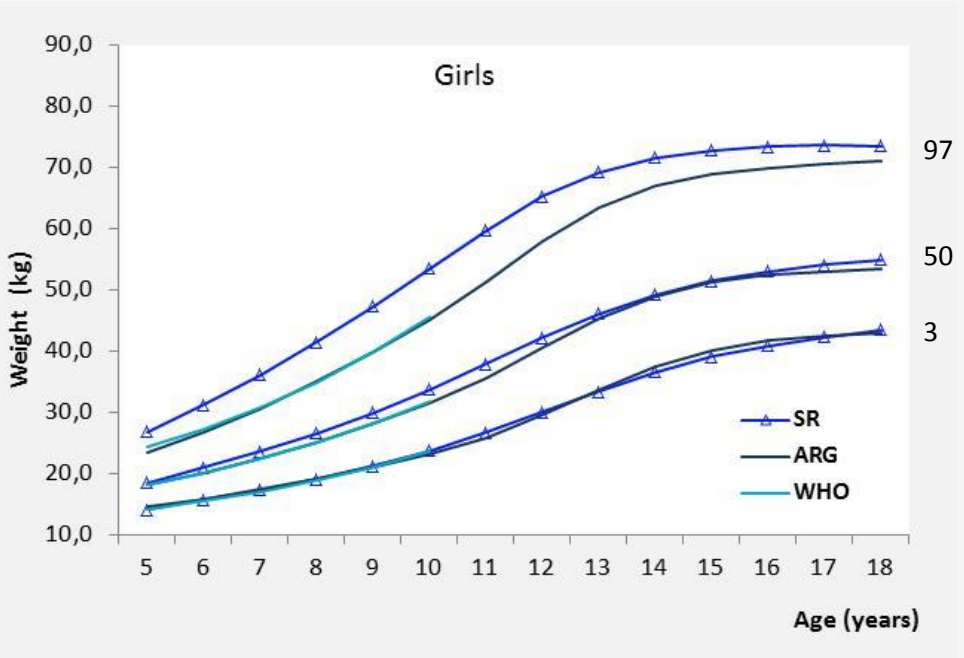
Secular acceleration?



References: Cole (2000), Hauspie and Vercauteren (2004)

Weight variations



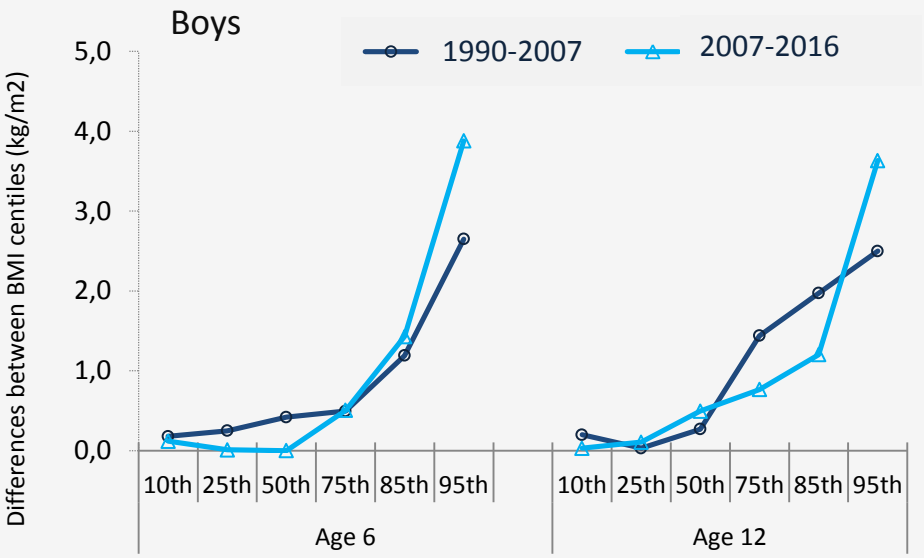


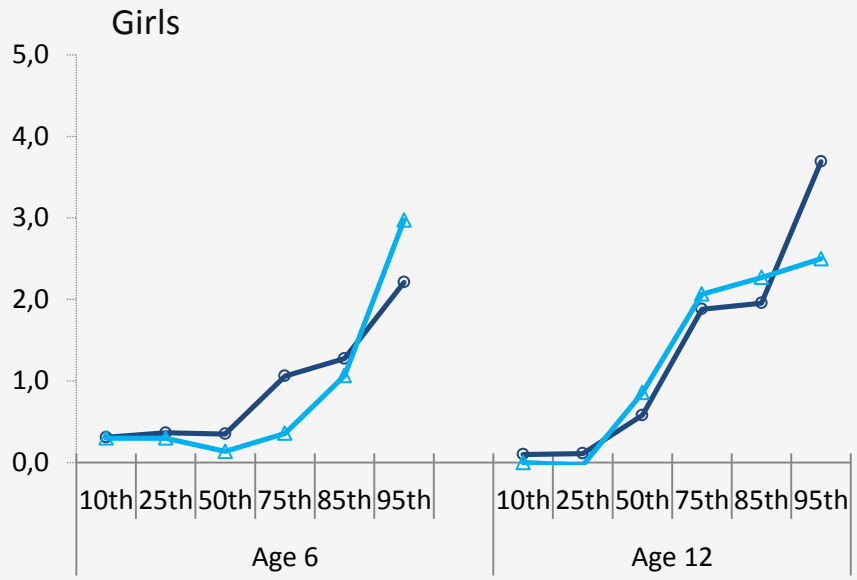
	ARG - SR			WHO - SR		
Age	3rd	50th	97th	3rd	50th	97th
5	-1,9	-1,1	-6,0 *	-2,9 *	-1,9 *	-6,6 *
6	-2,0 *	-1,7 *	-7,7 *	-2,0 *	-2,2 *	-8,8 *
7	-1,5 *	-1,9 *	-8,8 *	-1,2 *	-2,2 *	-10,0 *
8	-1,0 *	-2,0 *	-9,5 *	-0,8 *	-2,5 *	-10,8 *
9	-0,6 *	-2,3 *	-9,9 *	-0,8 *	-3,0 *	-11,1 *
10	-0,8 *	-2,7 *	-10,0 *	-1,1 *	-3,4 *	-11,2 *
11	-1,2 *	-3,2 *	-9,8 *			
12	-1,8 *	-3,3 *	-8,8 *			
13	-2,1 *	-2,8 *	-7,1 *			
14	-1,8 *	-1,7 *	-5,3 *			
15	-1,1 *	-0,7 *	-3,8 *			
16	-0,7 *	-0,4 *	-3,1 *			
17	-1,2 *	-0,8 *	-2,9 *			
18	-2,3 *	-1,6 *	-2,8 *			

	ARG - SR			WHO - SR		
Age	3rd	50th	97th	3rd	50th	97th
5	1,2	-0,8	-5,9 *	-0,3	-0,5	-4,0 *
6	0,5	-1,8 *	-6,9 *	-0,4 *	-1,6 *	-5,9 *
7	0,2	-2,2 *	-7,2 *	-0,7 *	-2,4 *	-7,0 *
8	0,0	-2,3 *	-7,1 *	-0,5 *	-2,6 *	-7,4 *
9	-0,5	-2,7 *	-7,4 *	-0,2	-2,6 *	-7,3 *
10	-1,1 *	-3,0 *	-7,4 *	-0,1	-2,5 *	-6,9 *
11	-1,3 *	-2,7 *	-6,6 *			
12	-0,7 *	-1,8 *	-5,2 *			
13	0,3 *	-0,8 *	-3,9 *			
14	1,1	-0,3	-2,9 *			
15	1,3	-0,2	-2,4 *			
16	0,9 *	-0,5 *	-2,1 *			
17	0,3	-0,9 *	-1,8 *			
18	-0,6 *	-1,3 *	-1,5 *			

Source: Orden and Apezteguía (2016)

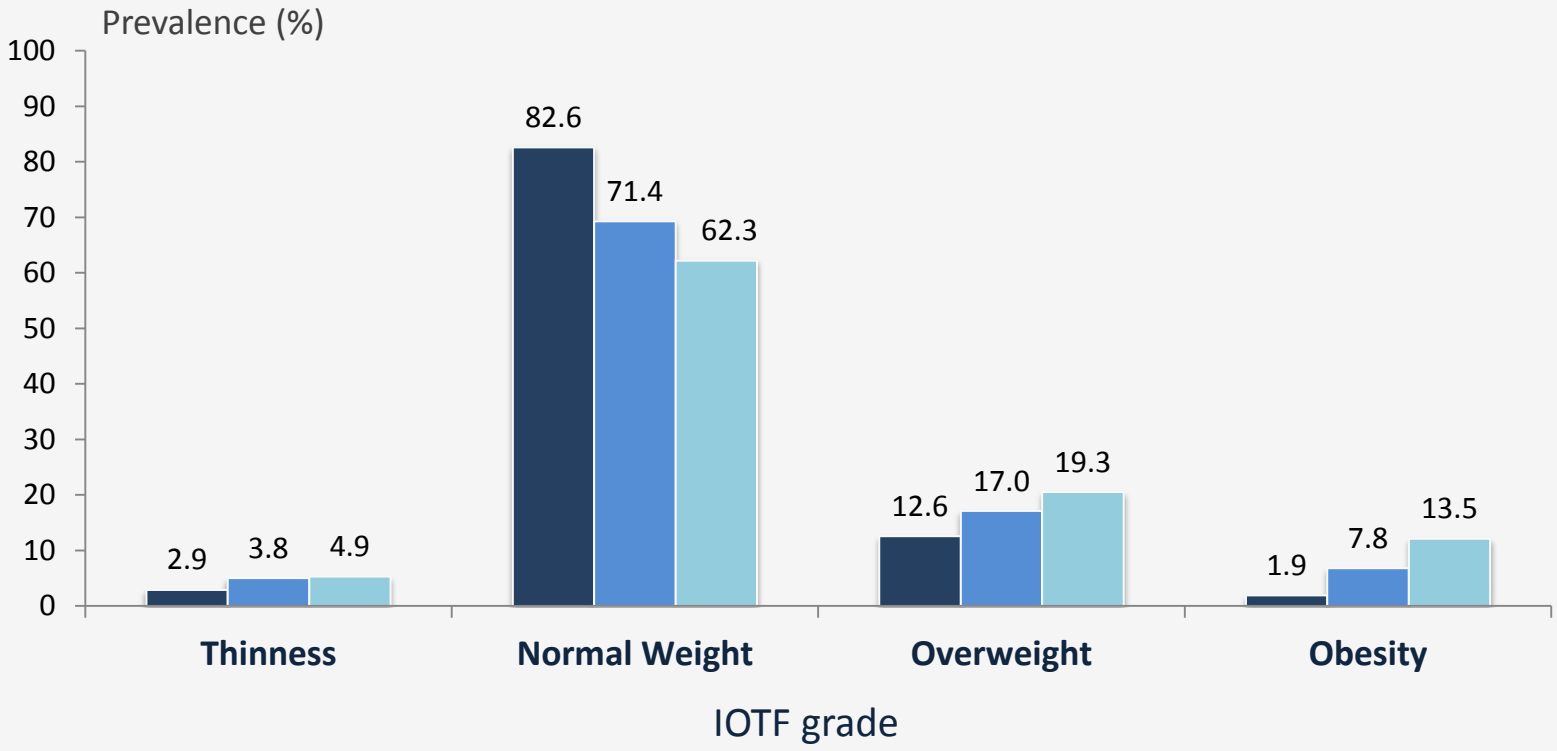
Changes in BMI distribution: 1990 – 2007 – 2016





Source: Orden et al. (2013), Orden (2016)

Secular changes in overweight and obesity: 1990-2007-2016



	Dif. 1990 - 2007	p-value	OR (CI95%)	Dif. 2007 - 2016	p-value	OR (CI95%)
Overweight	4.5	0.002	1.4 (1.1-1.8)	2.2	0.023	1.2 (1.1-1.5)
Obesity	6.7	0,000	4.3 (2.8- 6.5)	4.9	0.010	1.9 (1.5-2.4)

References Cole et al. (2000; 2007), Orden et al. (2013), Orden (2016)

Conclusions

- Growth variations between populations become larger around the adolescent growth spurt resulting in differences in adult size, so that universal references should be used only with descriptive-comparative purposes for the anthropometric assessment of adolescents in developing countries such as Argentina.

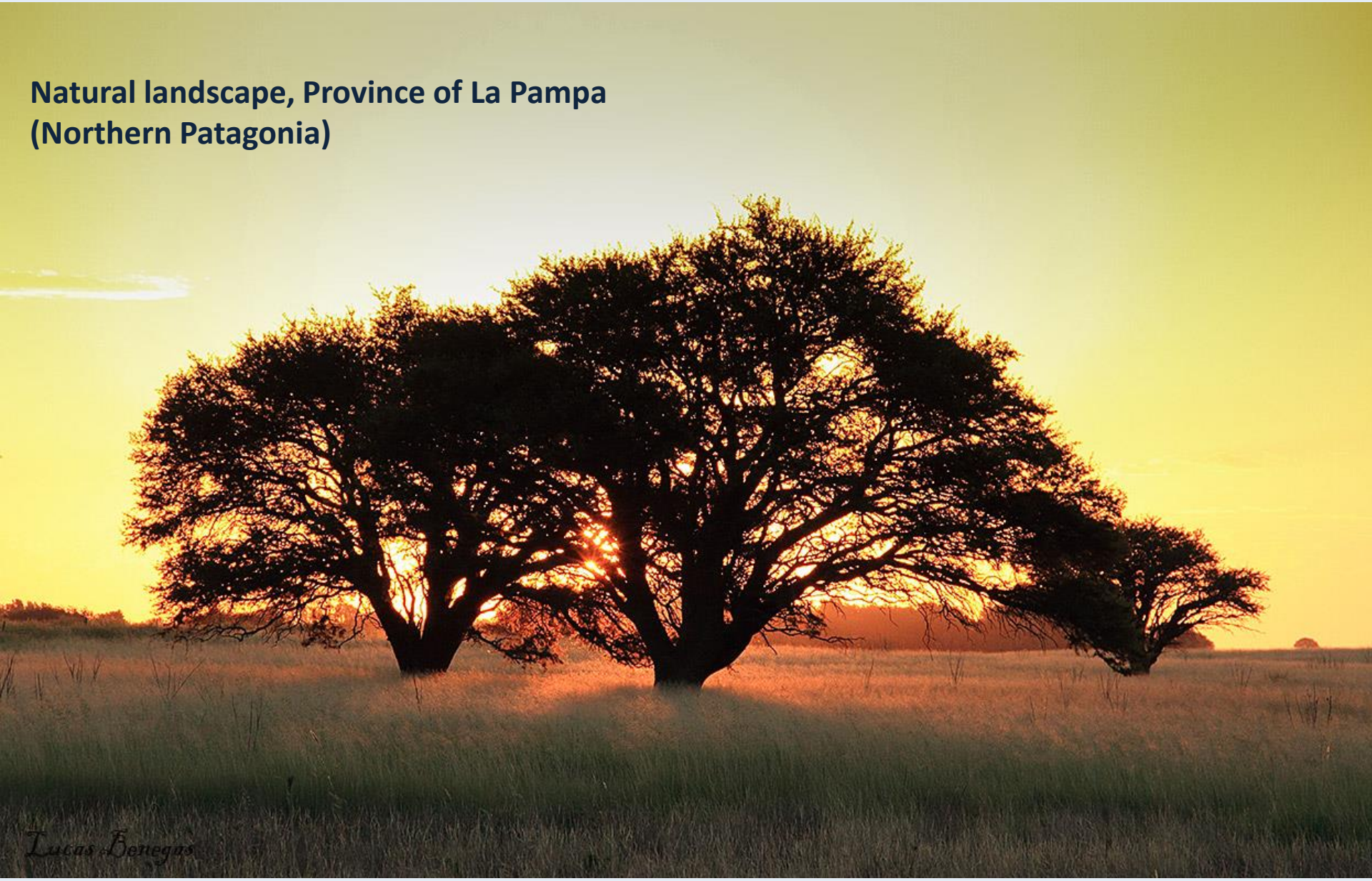
- Linear growth in this Argentinian population has not improved substantially during the last three decades especially in girls, validating the usefulness of the national reference for growth assessment in children and adolescents.

- A secular acceleration could explain why pre-pubertal boys and girls are taller than their ARG age peers with no changes in adult height.

- The disharmonic changes in weight and height altered the BMI distribution and are responsible for the increase in overweight and obesity. Such increase has been more accelerated from 1990 - 2007 than 2007 - 2016.

Although these findings are not intended to reflect the growth of all Argentinian children and adolescents, but provide a descriptive perspective of the current physical growth of urban children and adolescents of the country.

Natural landscape, Province of La Pampa (Northern Patagonia)



Thank you!