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# **Birth weight and metabolic syndrome in young adults: results from the 1982 Pelotas Birth Cohort**



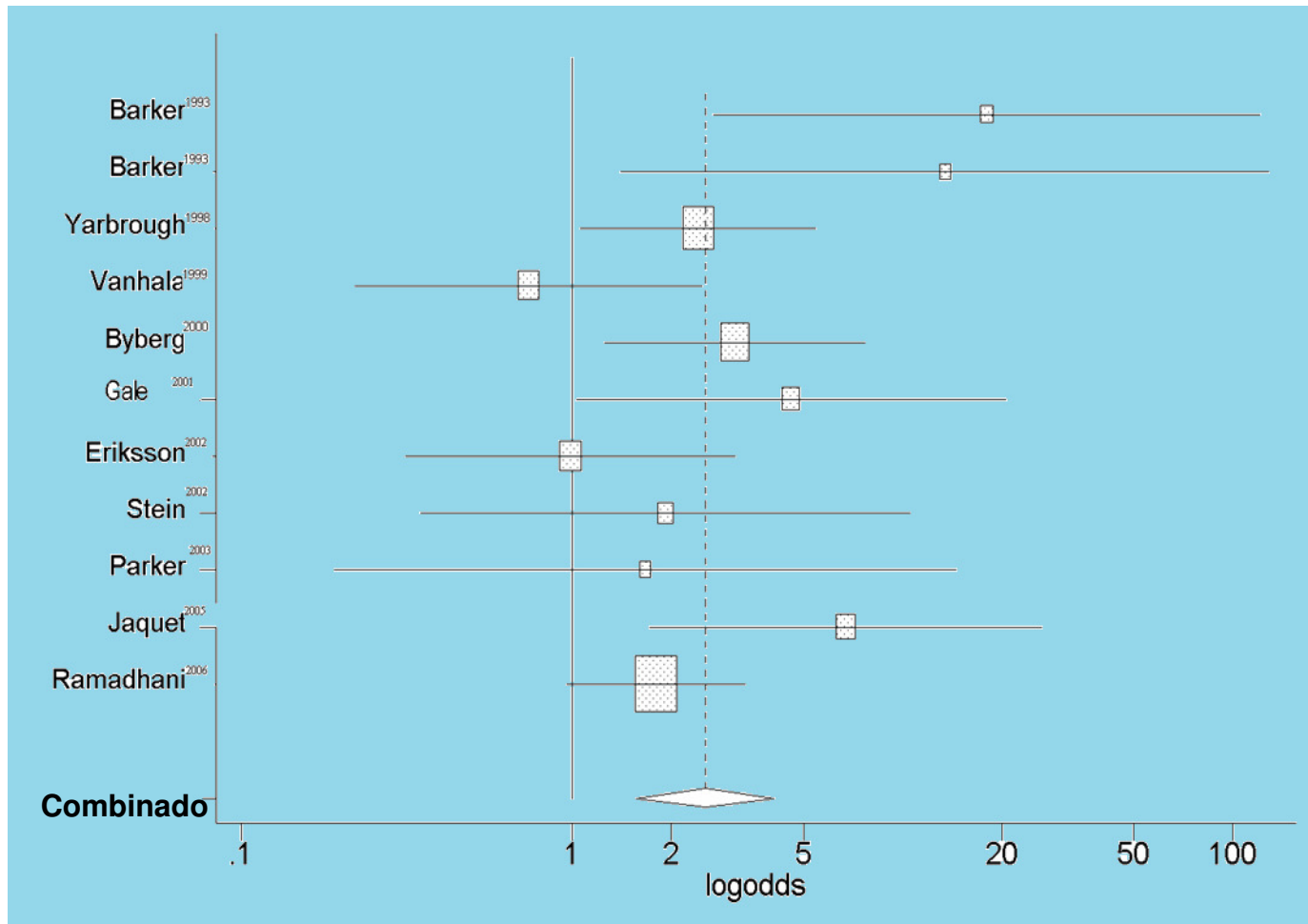
**Vera Maria Freitas da Silveira  
Bernardo Lessa Horta**

# Introduction

- ✓ **Barker : fetal origin of chronic diseases**  
*Barker et al 1989*
- ✓ **Low birth weight is a problem in Brazil**
- ✓ **Obesity as a child is associated to obesity as an adult**  
*Baird et al 2005*
- ✓ **Metabolic Syndrome is associated to IUGR**  
*Silveira&Horta 2008*
- ✓ **Controversy with fetal origins studies**  
*Kramer,2000|Cole,2004*



# Birth weight and metabolic syndrome in adults: meta-analysis-Published in Rev Saude Publica,2008; 42(1) 10-8 ,Silveira&Horta



**EFEITO COMBINADO 2,53**  
**IC 95% 1,57-4,08)**

# Metabolic syndrome in Brazil

- Girls 12-18yrs of public schools, Niterói: 3,2% (21,4% in obese)  
*Alvarez MR, 2006*
- Ribeirão Preto Cohorte , 23-25 anos: 10,7% men/4,8% women  
*Barbieri MA, 2006*

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# Objectives

- ✓ Describe the prevalence of Metabolic Syndrome in the participants of 1982 Pelotas Birth Cohort
- ✓ Evaluate the role of birth weight and maternal characteristics on the occurrence of MS in this cohort

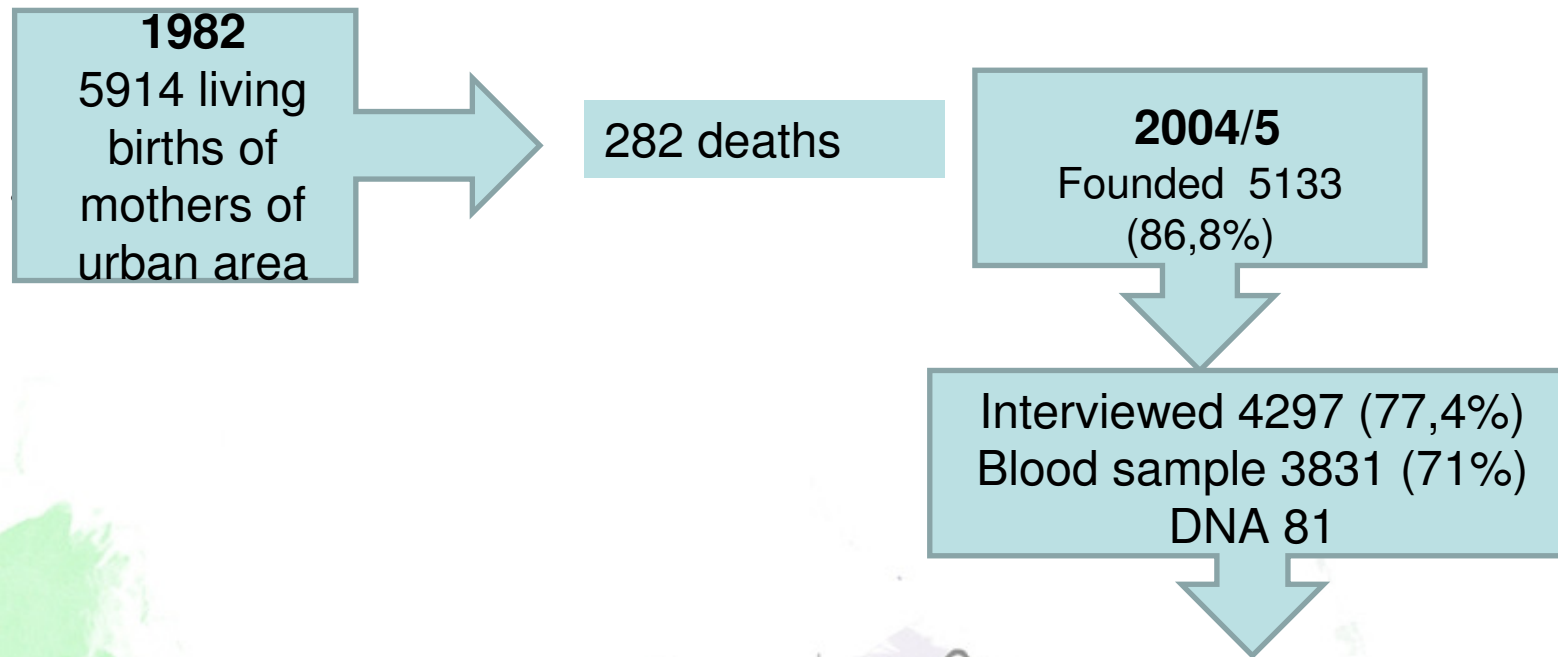
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# Methods

## • Cohort Population

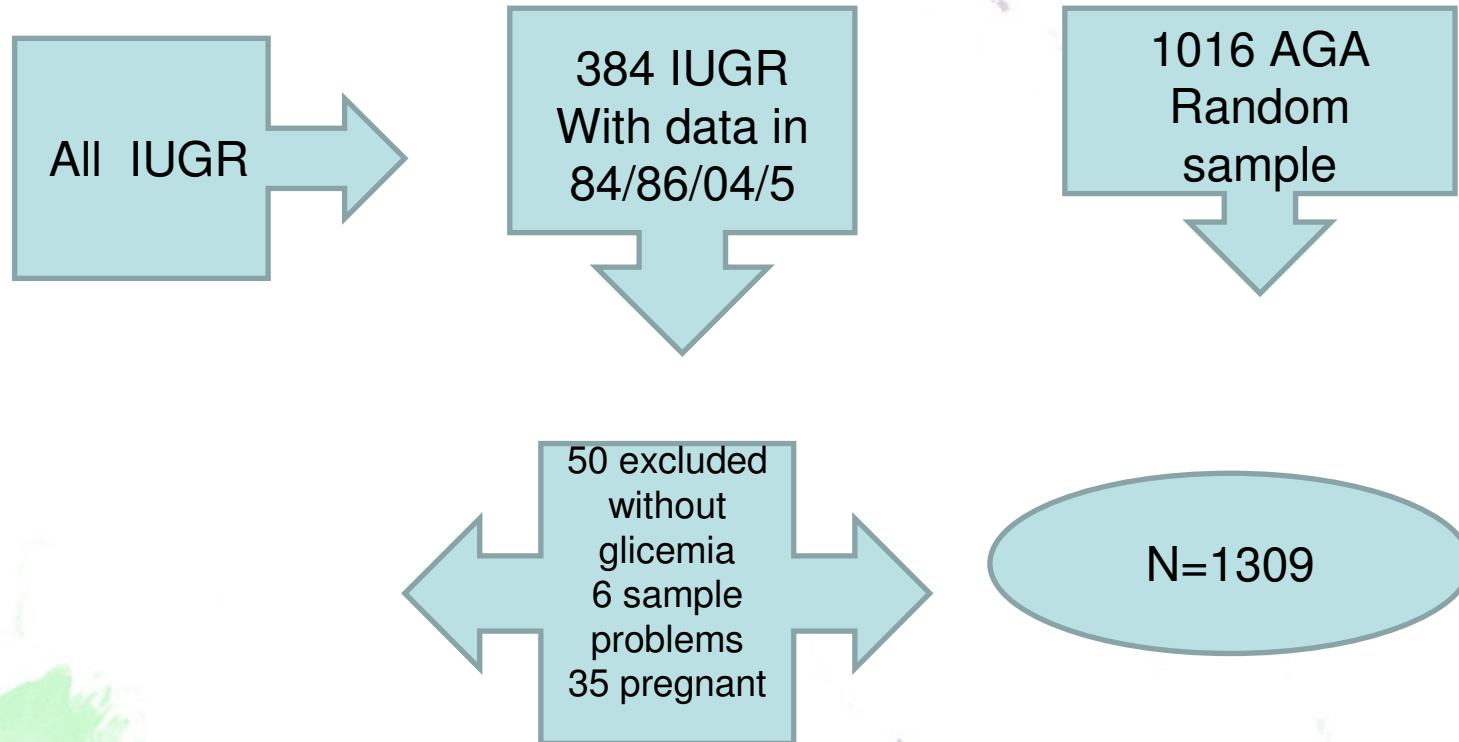


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# Our sample in 2004/5



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# Methods

- ✓ **Interview**
- ✓ **Measures:** weight, height, waist circumference, blood pressure
- ✓ **Samples:** Glicemia, triglycerides, HDL-Cholesterol
- ✓ Metabolic Syndrome
  - ✓ NCEP
  - ✓ IDF
- ✓ **Analysis:** Stata 9.0; Chi-squared, linear regression for exploring analysis and Poisson Regression, with robust variance. All data was weighted and stratified by sex

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# Metabolic Syndrome definitions

three of the following

NCEP-ATP III (2001)		IDF (2005)
Waist circumference	>102 cm in men >88 cm in women	≥ 94 cm in men * ≥ 80 cm in women
Triglycerides	≥ 150mg/dL	≥ 150 mg/dL or treatment
Blood Pressure	systolic ≥130 or diastolic ≥ 85 mmHg	systolic ≥ 130 or diastolic ≥ 85 mmHg, or treatment
HDL-Cholesterol	<40mg/dL in men < 45 mg/dL in women	<40mg/dL in men < 50 mg/dL in women, or treatment
Glicemia	≥110mg/dL(> 100mg/dL)	≥ 100mg/dL or diabetes
*plus any two of the others		

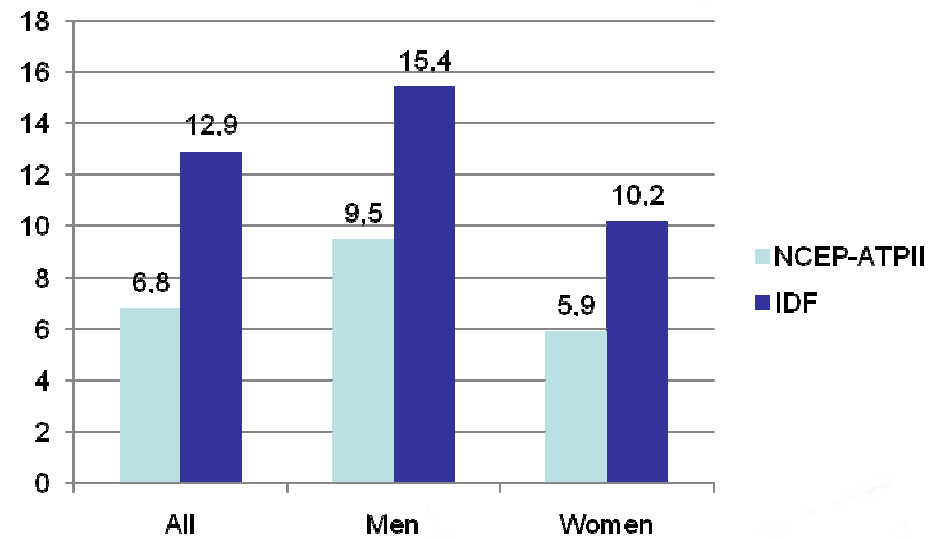
# Results

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# Prevalence of metabolic syndrome



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<b>Table 1. Prevalence of MS, according to NCEP-ATP III, by early characteristics in the 1982 Pelotas Birth Cohort, at 23yrs.</b>		
<b>Variable</b>	<b>Prevalence (%)</b>	<b>Relative Risk</b>
<b>Skin color of the mother</b>	p= 0,21	
White	8,3	1,00
Black	5,4	0,65(0,33-1,29)
<b>Maternal age (years)</b>	p = 0,32	
< 20	7,2	1,00
20 - 29	8,9	1,23(0,61- 2,47)
≥ 30	6,1	0,84(0,39-1,83)
<b>Maternal height(terciles)</b>	p= 0,22	
Lower	6,9	1,00
Middle	6,7	0,98(0,55-1,74)
Upper	10,1	1,46(0,85- 2,52)

\*p tendência

Cont. of Table 1		
<b>Maternal school years</b>	p= 0,54	
0 - 4	8,9	1,00
5 - 8	6,7	0,76(0,45-1,28)
≥ 9	8,4	0,94(0,54-1,65)
<b>Family income at birth(terciles)</b>	p = 0,96	
	8,0	1,00
Lower	7,5	0,93(0,53-1,62)
Middle	8,0	0,99(0,57-1,74)
Upper		
<b>Maternal tabagism in pregnancy</b>	p=0,05	
Zero	6,8	1,00
Smoked 1-14 cigarrets	11,3	1,66(1,05-2,64)
Smoked 15 or more cigarrets	4,6	0,67(0,22- 2,04)
<b>Pre-gestational maternal BMI</b>	p= 0,24*	
<20,00	5,3	1,00
20-24,9	6,4	1,15(0,60-2,23)
≥ 25	8,5	1,50(0,74-3,03)

\*p tendência

Cont. of Table 1		
<b>Birth weight(kilograms)</b>	p= 0,72	
≤ 2500	6,8	1,00
2501-3000	6,9	1,03(0,44-2,42)
>3000	8,2	1,21(0,55-2,70)
<b>Small for gestational weight\</b>	p=0,60	
No	7,9	1,00
Yes	7,0	0,89(0,56-1,40)
<b>Birth weight for gestational age(z score terciles)</b>	p= 0,92*	
Lower	6,1	1,00
Middle	6,0	0,96(0,39-2,37)
Upper	8,1	1,04(0,44-2,50)

\*p tendência

**Table 2. Prevalence of MS, according to NCEP-ATP III, crude and adjusted by maternal features and birthweight in females of the 1982 Pelotas Birth Cohort, at 23yrs.**

<b>Variable</b>	<b>RR(Crude)</b>	<b>RR(Adjusted)</b>
<b>Skin color of the mother</b>	p= 0,53	p=0,96#
White	1,00	1,00
Black	1,34(0,53-3,39)	0,98(0,38-2,49)
<b>Maternal age (years)</b>	p=0,53	p=0,41#
< 20	1,00	1,00
20 - 29	1,03(0,51- 2,09)	1,49(0,42-5,27)
≥ 30	0,75(0,34-1,67)	0,85(0,21-3,46)
<b>Maternal height(terciles)</b>	p=0,37	p= 0,17@
Lower	1,00	1,00
Middle	1,68(0,60-4,72)	2,01(0,75-5,42)
Upper	2,12(0,75- 5,98)	2,63(0,95-7,30)

\*p categorical# adjusted for mother skin color and age, family income at birth and school years of the mother &adjusted for income at birth  
 @adjusted for income at birth and tabagism in pregnancy \*adjusted for income at birth, tabagism in pregnancy e maternal height.



Cont. of Table 2		
<b>Maternal school years</b>	p=0,87	p=0,45#
0 - 4	1,00	1,00
5 - 8	1,27(0,51-3,15)	1,82( 0,71-4,66)
≥ 9	1,10(0,40-3,00)	1,77(0,38-8,24)
<b>Family income at birth(terciles)</b>	p=0,30	p=0,13 #
Lower	1,00	1,00
Middle	0,50(0,20-1,25)	0,40(0,16-1,00)
Upper	0,63(0,26-1,50)	0,46(0,11-1,86)
<b>Maternal tabagism in pregnancy</b>	p=0,16	p=0,14&
Zero	1,00	1,00
Smoked 1-14 cigarrets	2,01(0,95-4,27)	1,99(0,96- 4,16)
Smoked 15 or more cigarrets	0,74(0,10-5,46)	0,69(0,09-5,32)
<b>Pre-gestational maternal BMI</b>	p=0,73*	p= 0,95* @
<20,00	1,00	1,00
20-24,9	0,81(0,30-2,17)	0,87(0,31-2,45)
≥ 25	0,80(0,25-2,54)	0,96(0,30-3,07)

\*p categorical# adjsuted for mother's skin color and age, family income at birth and school years of the mother &adjusted for income at birth @adjusted for incomeat birth and tabagism in pregnancy \*adjusted for income at birth, tabagism in pregnancy e maternal height.

Cont. of Table 2		
<b>Birth weight(quilograms)</b>		
≤ 2500	p=0,74*	p= 0,79*
2501-3000	1,00	1,00
>3000	1,25(0,38-4,05)	1,29(0,38-4,39)
	1,30(0,44-3,82)	1,30(0,39-4,28)
<b>Small for gestational weight\</b>	p=0,79	p= 0,72*
No	1,00	1,00
Yes	0,90(0,42-1,93)	0,86(0,39-1,94)
<b>Birth weight for gestational age(z escore terciles)</b>	p= 0,92*	p= 0,73**
Lower	1,00	1,00
Middle	0,96(0,39-2,37)	0,96(0,39-2,39)
Upper	1,04(0,44-2,50)	1,16(0,50-2,73)

\*p categorical# adjusted for mother's skin color and age, family income at birth and school years of the mother &adjusted for income at birth @adjusted for income at birth and tabagism in pregnancy \*adjusted for income at birth, tabagism in pregnancy e maternal height.

**Table 3. Prevalence of MS, according to NCEP-ATP III, crude and adjusted by maternal features and birthweight in males of the 1982 Pelotas Birth Cohort, at 23yrs.**

<b>Variable</b>	<b>RR(Crude)</b>	<b>RR(Adjusted)</b>
<b>Skin color of the mother</b>	p= 0,04	p=0,08#
White	1,00	1,00
Black	0,35(0,13-0,96)	0,40(0,14-1,12)
<b>Maternal school years</b>	p=0,20	p=0,09*#
0 - 4	1,00	1,00
5 - 8	0,56(0,29-1,08)	0,47( 0,24-0,92)
≥ 9	0,90(0,46-1,76)	0,73(0,29-1,85)
<b>Family income at birth(terciles)</b>	p=0,42*	p=0,43*#
Lower	1,00	1,00
Middle	1,44(0,71-2,95)	1,47(0,69-3,15)
Upper	1,38(0,66-2,88)	1,32(0,49-3,52)

\* \*p categorical# adjsuted for skin color, family income at birth and school years of the mother &adjusted for skin color of the mother and maternal school years @adjusted for skin color of the mothe, maternal school years and pre-gestational maternal BMI

Cont. of Table 3		
<b>Pre-gestational maternal BMI</b>	p=0,20*	p= 0,04*&
<20,00	1,00	1,00
20-24,9	1,25(0,56-2,79)	1,57(0,66-3,76)
≥ 25	1,60(0,76-3,37)	2,40(0,97-5,95)
<b>Birth weight for gestational age(z escore terciles)</b>	p= 0,15*	p= 0,26*@
Lower	1,00	1,00
Middle	0,95(0,46-1,98)	0,98(0,46-2,07)
Upper	1,57(0,84-2,93)	1,47(0,75-2,87)

\*p categorical# adjsuted for skin color, family income at birth and school years of the mother &adjusted for skin color of the mother and maternal school years @adjusted for skin color of the mothe, maternal school years and pre-gestational maternal BMI

# Conclusions

- No association was found between MS and birth weight, socioeconomic level at birth ou maternal characteristics, but
- Those whose mothers smoke  $\leq 14$  cigarrets/d had RR1,66 of MS in crude analysis
- In men, maternal pre-gestational BMI was directly associated with MS (RR 2,40,  $p=0.04$ )
  - There was a tendency that mothers of black skin color was negatively associated with MS( RR0,35 , $p=0,04$ , only in crude analysis
  - In women, there is a tendency that mothers of higher height was associated with MS with RR 2,63(CI 95% 0,95-7,30)
- Studies with both early and current risk factors are needed to help understand the complexity of the problem

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# Thank you!

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