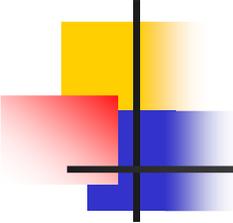


# **Size at birth and lipoprotein levels in adulthood**

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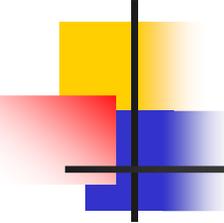
**Two prospective studies in  
Latin American cities**



# Authors

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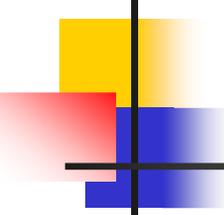
- **Brasil (Ribeirao Preto)**
  - **Marco Barbieri, Heloisa Bettiol,**(Ribeirao Preto)
  - **Antônio Augusto M da Silva .** (Universidade Federal de Maranhao)
- **Chile (Limache)**
  - **Hugo Amigo, Patricia Bustos, Maria Elena Alvarado** (Facultad de Medicina Universidad de Chile)
- **United Kingdom**
  - **Roberto Rona, King's College London**



# Background

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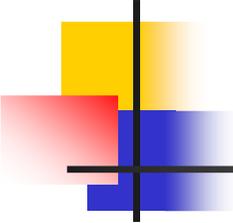
- Several reports support a relationship between birthweight and coronary heart disease, high blood pressure and diabetes mellitus.
- But the evidence for an association between impaired growth in uterus and adult lipoprotein levels remains elusive and far from compelling.



# Background

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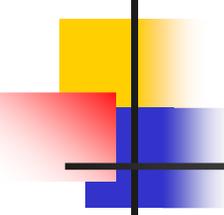
- Most studies have been carried out in developed countries.
- It would be relevant to assess the hypothesis in countries which have started a fast economic development with marked inequality in wealth distribution, such as Brazil and Chile.



# Objective

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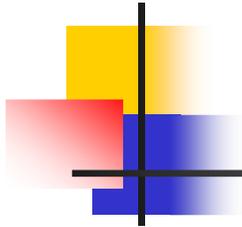
- To assess the association between size at birth and lipoprotein levels in young adults in Limache (Chile) and Ribeirao Preto in (Brasil).



# Subject and method

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- A concurrent longitudinal design was used in the Brazilian study and a non-concurrent longitudinal design in the Chilean study



Born in Ribeirao  
Preto between 1978-  
1979

N=6827



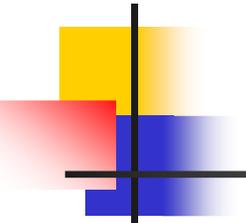
N=2063

Born in Limache between  
1974-1978

N = 3057



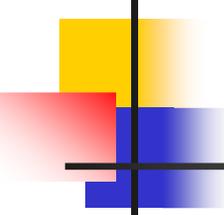
N = 999



## Socioeconomic and anthropometric information

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- The same questionnaire was used in the two studies to collect information.
- The anthropometric measurements were carried out at hospitals and the blood samples were obtained following a fasting period of 12 hours. Lipids were measured using a colorimetry enzymatic method.
- The measurements, in both countries, were made by trained university nurses following international procedures



# Measurements at birth

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- Chile

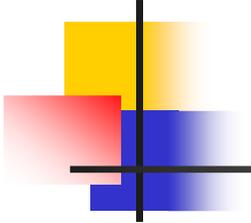
- Weight and length at birth were obtained from records in the maternity ward. These measurements were carried out by midwives following the established norms

- Brasil

- Weight and length at birth were carried out by trained nurses.

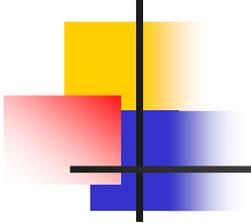
Anthropometric measurements (Means and 95% CI) at birth in Chilean and Brazilian young adults by sex.

	Total n=3062	Men n=1432	Women n=1630	Chile n=999	Brazil n=2063	Men vs. women <i>Pvalue(&lt;)</i>	Chile vs. Brazil <i>Pvalue (&lt;)</i>
Birthweight (g)	3237 (3222-3257)	3295 (3269-3322)	3187 (3163-3211)	3177 (3150-3212)	3267 (3246-3289)	0.0001	0.0001
Body mass index at birth (kg /m <sup>2</sup> )	13,30 (13.25-13.35)	13,36 (13.33-13.44)	13,24 (13.18-13.32)	12.96 (12.86-13.05)	13.46 (13.40-13.52)	0.044	0.0001
Length at birth (cm)	49.25 (49.17-49.33)	49.57 (49.45-49.67)	48.98 (48.67-49.08)	49.44 (49.31-49.57)	49.16 (49.06-49.26)	0.0001	0.0001
Adult Body mass index (kg/m <sup>2</sup> ) Mean (95%CI)	24.79 (24.63-24.97)	25.10 (24.88-25.32)	24.52 (24.26-24.77)	25.82 (25.54-26.09)	24.29 (24.08-24.50)	0.001	0.0001
Obesity in adult life % (95% CI)	13.0 (12.5-13.4)	11,8 (11.3-12.2)	14.0 (13.7-14.2)	15.48 (13.2 -17.7)	11.8 (10.4 – 13.2)	0.072	0.006



**Plasma lipid levels (means and 95% CI) according to sex and country in Chilean and Brazilian young adult**

	<b>Men</b>	<b>Women</b>	<b>Chile</b>	<b>Brazil</b>	<b>Total women vs. men <i>P</i></b>	<b>Total Chile vs. Brazil <i>p</i></b>
Total cholesterol (mg/dl) (95%CI)	168.5 (166.5-170.5)	173.6 (171.8-175.4)	178.4 (175.-9-180.7)	167.7 (166.1-169.3)	0.000	0.000
LDL (mg /dl) (95%CI)	104.5 (102.7-106.2)	105.9 (104.3-107.5)	114.6 (112.4-116.8)	100.6 (99.3-102.0)	0.237	0.000
HDL (mg /dl) (95%CI)	42.5 (41.8-43.0)	49.2 (48.5-49.9)	41.4 (40.7-42.1)	48.3 (47.8-48.9)	0.000	0.000
Tryiglicerides (mg /dl) (95%CI)	108.3 (104.7-112.0)	92.9 (90.4-95.3)	112.4 (108.1-116.7)	108.7 (91.9-102.1)	0.001	0.001

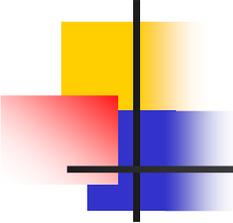


**Plasma lipid levels (means and 95% CI) according to sex and country in Chilean and Brazilian young adult**

	<b>Men</b>	<b>Women</b>	<b>Chile</b>	<b>Brazil</b>	<b>Total women vs. men <i>P</i></b>	<b>Total Chile vs. Brazil <i>p</i></b>
Total cholesterol (mg/dl) (95%CI)	168.5 (166.5-170.5)	173.6 (171.8-175.4)	178.4 (175.-9-180.7)	167.7 (166.1-169.3)	0.000	0.000
LDL (mg /dl) (95%CI)	104.5 (102.7-106.2)	105.9 (104.3-107.5)	114.6 (112.4-116.8)	100.6 (99.3-102.0)	0.237	0.000
HDL (mg /dl) (95%CI)	42.5 (41.8-43.0)	49.2 (48.5-49.9)	41.4 (40.7-42.1)	48.3 (47.8-48.9)	0.000	0.000
Tryiglicerides (mg /dl) (95%CI)	108.3 (104.7-112.0)	92.9 (90.4-95.3)	112.4 (108.1-116.7)	108.7 (91.9-102.1)	0.001	0.001

## Association between anthropometric measurements at birth by adult obesity status and plasma levels of total cholesterol and LDL

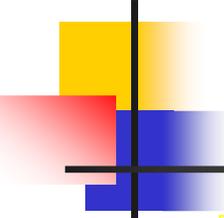
	Coolesterol total (mg/dl)			LDL (mg/dl)		
	Coef	95% CI	P	Coef	95% CI	P
<b>Increase Birth weight (kg)</b>						
<u>Obesity</u>	-14.57	-22.09 to -7.05	0.000	-11.84	-18.67 to -5.02	0.001
<u>Whithout Obesity</u>	-0.30	-3.08 to 2.48	0.830	0.53	-1.23 to 2.99	0.671
<b>BMI at birth (Kg /m<sup>2</sup>)</b>						
<u>Obesity</u>	-5.09	-7.59 to -2.58	0.000	-4.24	-6.52 to -1.97	0.000
<u>Whithout Obesity</u>	-0.3	-1.23 to 0.62	0.525	-0.10	-0.92 to 0.72	0.807



# Conclusion

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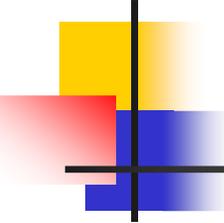
- There was a consistent interaction between birthweight and BMI at birth and obesity in the adult on LDL and total cholesterol.
- These findings were separately observed in the Brazilian and the Chilean sample.
- Birthweight and BMI at birth were not associated with HDL and triglycerides



# Discusión

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- These findings suggest that a lower birthweight would make a subject more susceptible to having an unfavourable lipid profile if he/she were to become obese in adulthood.
- This is relevant for public health because it would indicate that obesity prevention would provide a way to reduce the risk of a high LDL level or total cholesterol in the population.



# Discussion

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- Obesity control in populations exposed to fetal malnutrition, a common situation in some developing countries, may offer a feasible intervention to lower total cholesterol and LDL .
- If anything, the more appropriate approach could be to provide extra resources to tackle obesity in those who had low birthweight.