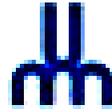


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EPIDEMIOLOGIA NA CONSTRUÇÃO DA SAÚDE PARA TODOS:  
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# Life course social and health conditions linked to frailty in Brazilian older men and women

**Guerra RO<sup>1</sup>, Alvarado BE<sup>2</sup>, Zunzunegui MV<sup>3</sup>, Béland F<sup>3</sup>, Bamvita JM<sup>3</sup>.**

1. Department of Physical Therapy. Federal University of Rio Grande do Norte – Brazil;

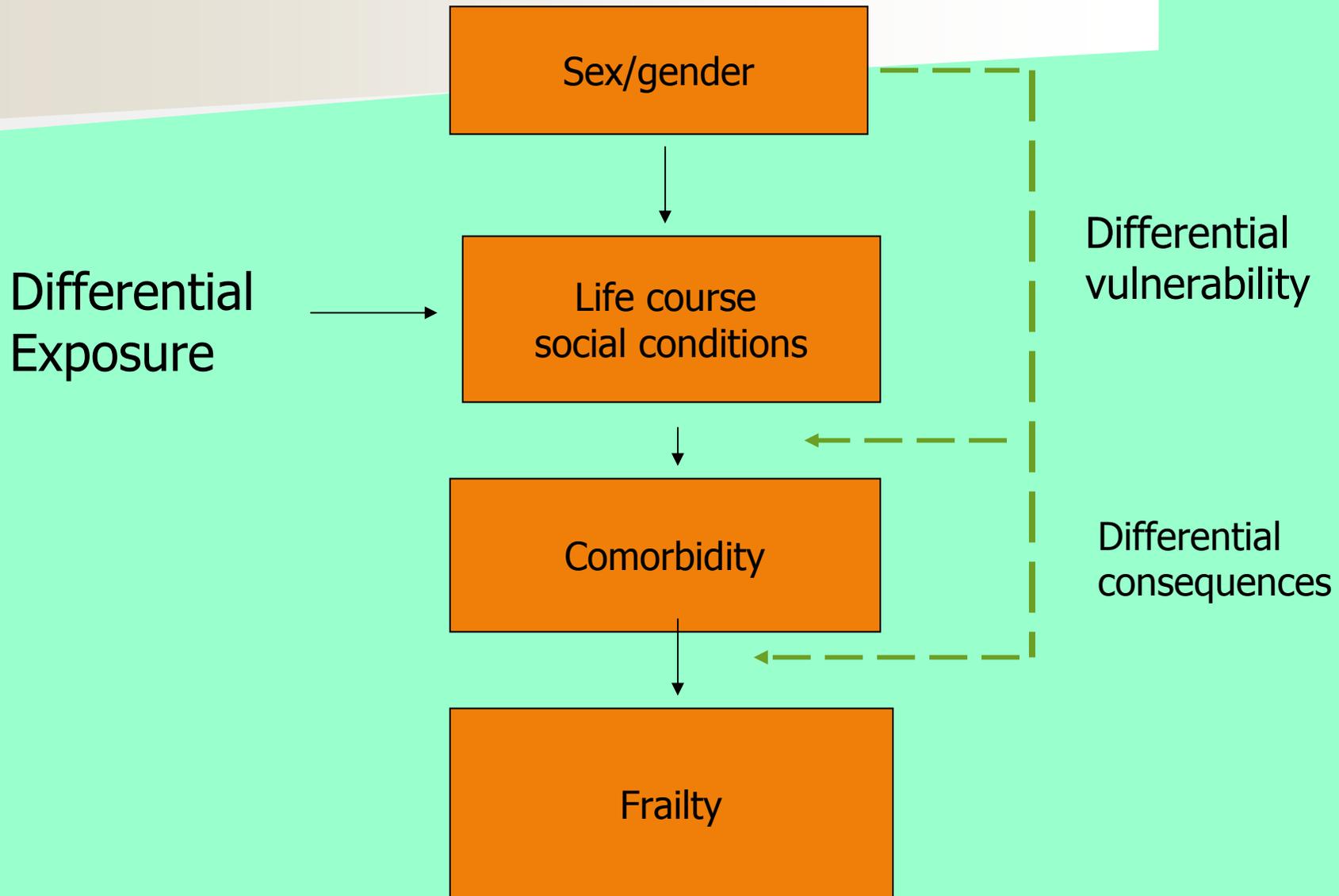
2. Department of Epidemiology. McGill University– Canada

3. Departement de Medecine Sociale et Preventive. Université de Montreal - Canada

# Background

- Frailty is defined as a biologic syndrome of decreased reserve and resistance to stressors, resulting from cumulative declines across multiple physiologic systems, and causing vulnerability to adverse outcomes
- Gender, social conditions and health throughout the life course affect functional health in later life.

# Conceptual Framework



- This study addresses two specific hypotheses:

- 1) life-course social and health conditions are associated with frailty;
- 2) differential exposure and/or vulnerability of women and men to life-course conditions may account for gender differences in frailty.

## Methods

- The SABE project (Salud Bienestar y Envejecimiento; Spanish words for health, well-being and aging) is a multicentric cross-sectional study, conducted in 1999-2000, involving 10,661 men and women aged 60 and over, in seven Latin American and Caribbean (LAC) cities:
  - Buenos Aires, Argentina (n=1,043);
  - Bridgetown, Barbados (n=1,508);
  - **Sao Paulo, Brazil (n=2,143);**
  - Santiago, Chile (n=1,301);
  - Havana, Cuba (n=1,905);
  - Mexico City, Mexico (n=1,311)
  - Montevideo, Uruguay (n=1,450)

# Methods

- Data originated from a cross-national survey of older adults living in Sao Paulo – SABE Study.
- Frailty was operationalized using the five components proposed by Fried & al (2001).
  - nutrition,
  - strength,
  - endurance and energy,
  - mobility,
  - physical activity.
- a pre-frail state was defined as the presence of one or two of the above criteria.
- Associations between frailty and social and health indicators were examined using a proportional odds ordinal logistic regression.

# Methods

## ■ *Nutrition:*

- self-reported unintentional weight loss of more than 10 pounds (3 kg) over the previous three months (one point). SABE data do not provide objective measurements of weight loss.

# Methods

## ■ *Strength:*

- physical performance on the grip strength test.
- For those able to take the test, weakness was defined according to gender and the Body Mass Index (BMI).
- For men, BMI was grouped into four categories:  $\leq 24$ ; 24.1-26; 26.1-28; and  $> 28$ . For each category, the cut-offs for grip strength were set at  $\leq 29$ ;  $\leq 30$ ;  $\leq 30$ ; and  $\leq 32$ .
- For women, BMI was categorized as  $\leq 23$ ; 23.1-26; 26.1-29; and  $> 29$ . The corresponding grip strength cut-offs were  $\leq 17$ ;  $\leq 17.3$ ;  $\leq 18$ ; and  $\leq 21$ .
- Respondents fulfilling the criteria and unable to take the test due to physical limitations were assigned one point.

# Methods

## ■ *Endurance and energy:*

- definition based on two questions of the Geriatric Depression Scale (the scale used in SABE to measure depressive symptoms):
  - *do you have lots of energy (yes/no);*
  - *have you dropped many of your activities or interests (yes/no).*
  - A negative response to the first question and/or a positive response to the second were considered indications of poor endurance/lack of energy.

# Methods

## ■ *Mobility*

- walking time was not measured in the SABE survey as in Fried & al (2001).
- we considered limitations in lower extremity mobility. Subjects were considered to have lower body functional limitations if they experienced difficulty walking one hundred yards and/or climbing one flight of stairs

# Methods

## ■ *Physical activity*

- low energy expenditure was assessed via the question:
  - “In the last twelve months, have you exercised regularly or participated in vigorous physical activity such as playing a sport, dancing or doing heavy housework 3 or more times a week?”
  - Respondents answering “NO” were assigned one point.
  - The SABE surveys did not measure the number of kilocalories per week expended doing exercise.

# Life course conditions

## ■ Childhood health and socioeconomic circumstances

– were assessed via the questions:

■ “During the first 15 years of your life:

1) What was your family’s economic situation? (good/average/poor);

2) Was your health excellent, good or poor? (excellent/good/poor);

3) Were there times when you went hungry? (yes/no).

# Life course conditions

## ■ Adulthood socioeconomic circumstances

- were determined by the respondent's education and life-long occupation.
  - Four levels were used to measure education:
    - No schooling (no formal education, subject cannot read or write); primary (between 1 and 6 years of education); some secondary (between 7 and 12 years); and post-secondary (more than 12 years).
  - Occupation was recorded according to the International Standard Classification of Occupations (ISCO-88) and grouped into five categories as reported previously [24]:
    - a) higher level white collar (HWC);
    - b) lower level white collar (LWC);
    - c) skilled and unskilled blue collar workers;
    - d) housewives;
    - e) farm workers.
    - Housewives were analyzed in a separate category.

# Life course conditions

## ■ **Current material and social resources**

- Were defined as perceived sufficiency of income and marital status.
  - Perceived income was self-reported as sufficient or insufficient.
  - Marital status was categorized as 2 groups, i.e. presence or absence of a partner.

# Current health conditions

## ■ Comorbidity

- Self-report of hypertension, diabetes, cancer, lung disease, heart disease, stroke, and arthritis.
- A summated score of any of the medical conditions reported by respondents was created (range 0–7) and further categorized as: 0-1 versus 2 or more reported chronic conditions.

# Current health conditions

## ■ Anthropometric measures

- Participants' weight and height measurements were taken according to standard protocols.
- BMI was calculated as  $\text{kg/m}^2$ .

# RESULTS

**Table 1. Distribution of social, health factors and frailty components in women and men from Sao Paulo – Brazil.**

	Sao Paulo	
	(Brasil)	
	Women n=1262	Men n=881
<b>Childhood social and health circumstances</b>		
Economic situation (average/ poor),%	67.5*	73,1
Health first 15 years (good/poor),%	51,9	48,8
Hunger (yes),%	18,5	21,8
<b>Adult socio-economic position</b>		
Level of education (No schooling),%	29.3*	21,1
Occupation, %		
White-collar workers	23.0*	35,4
Blue-collar workers and farmers	67,0	64,6
Housewives	10,0	
<b>Current social and material circumstances</b>		
Perception of income (insufficient),%	69,0	67,9
Marital status (no partner), %	58.6*	20,9
<b>Health factors</b>		
Chronic conditions (> 2), %	45.4*	36,4
Body Mass Index, mean (SD)	27.2(5.2) *	25.0 (4.0)
<b>Frailty components</b>		
Weight loss, %	16,6	14,1
Weakness, %	51,9	51,0
Low endurance, %	27,8	26,2
Mobility limitations, %	48.2*	35,9
Poor physical activity, %	78.7*	75,1

\*p<= 0.05

# RESULTS

**Table 2. Distribution of frailty categories by sex in São Paulo-Brazil**

	<b>Non-Frail (%)</b>	<b>Pre-Frail (%)</b>	<b>Frail (%)</b>
<b>Sao Paulo</b>			
Women	107 (9.6)	516 (46.3)	491 (44.1)
Men	93 (12.1)	401 (52.4)	271 (35.4)
<i>Total</i>	200 (10.6)	917 (48.8)	762 (40.6)

# RESULTS

**Table 3. Age-adjusted odds\* for frailty by life-course social and health conditions. Sao Paulo - Brazil**

<b>Age, years</b>	1.11 (1.09-1.13)
<b>Gender</b>	
Women vs Men	1.62 (1.33-1.98)

<b><u>Childhood conditions</u></b>	
<b>Economic situation</b>	
Average vs good	1.00(0.79-1.26)
Poor vs good	1.05 (0.81-1.35)
<b>Health</b>	
Good vs excellent	1.40 (1.14-1.71)
Poor vs excellent	1.00 (0.66-1.50)
<b>Experience of hunger</b>	
Yes vs No	1.38 (1.06-1.77)

<b><u>Adult conditions</u></b>	
<b>Education (years)</b>	
No schooling vs post-secondary	2.04(1.25-3.34)
Primary vs post-secondary	1.03 (0.65-1.65)
Some secondary vs post- secondary	0.67 (0.38-1.18)
<b>Lifetime occupation</b>	
Housewives vs HWC	2.43 (1.39-4.25)
Farmers vs HWC	2.53 (1.44-4.45)
Skilled/Unskilled workers vs HWC	1.51 (1.04-2.12)
LWC vs HWC	1.24 (0.82-1.89)

<b><u>Current conditions</u></b>	
<b>Perception of income</b>	
Insufficient vs sufficient	1.66 (1.35-2.06)
<b>Marital status</b>	
Without partner vs with partner	1.32 (1.08-1.62)
<b>Comorbidity</b>	
2 or more conditions vs 0-1	2.68 (2.26-3.17)
<b>BMI</b>	1.06 (1.04-1.08)

# RESULTS

**Table 3. Age-adjusted odds\* for frailty by life-course social and health conditions. Sao Paulo - Brazil**

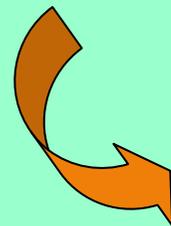
<b>Age, years</b>	1.11 (1.09-1.13)	<b>Adult conditions</b>	
<b>Gender</b>		<b>Education (years)</b>	
Women vs Men	1.62 (1.33-1.98)	No schooling vs post-secondary	2.04(1.25-3.34)
<b>Childhood conditions</b>		Primary vs post-secondary	1.03 (0.65-1.65)
<b>Economic situation</b>		Some secondary vs post- secondary	0.67 (0.38-1.18)
Average vs good	1.00(0.79-1.26)	<b>Lifetime occupation</b>	
Poor vs good	1.05 (0.81-1.35)	Housewives vs HWC	2.43 (1.39-4.25)
<b>Health</b>		Farmers vs HWC	2.53 (1.44-4.45)
Good vs excellent	1.40 (1.14-1.71)	Skilled/Unskilled workers vs HWC	1.51 (1.04-2.12)
Poor vs excellent	1.00 (0.66-1.50)	LWC vs HWC	1.24 (0.82-1.89)
<b>Experience of hunger</b>		<b>Current conditions</b>	
Yes vs No	1.38 (1.06-1.77)	<b>Perception of income</b>	
		Insufficient vs sufficient	1.66 (1.35-2.06)
		<b>Marital status</b>	
		Without partner vs with partner	1.32 (1.08-1.62)
		<b>Comorbidity</b>	
		2 or more conditions vs 0-1	2.68 (2.26-3.17)
		<b>BMI</b>	1.06 (1.04-1.08)

# RESULTS

**Table 4. Multivariate adjusted odds for frailty \* by life-course social and health conditions. Sao Paulo-Brazil.**

& interaction significant at  $p < 0.002$ . Odds ratio not shown but interactions were included in the entire model.

\* Proportional odds from ordinal logistic regression



	Sao Paulo OR (95%CI)
<b>Gender</b>	
Women vs Men	1.42 (1.07-1.89)
<b>Childhood conditions</b>	
<b>Economic situation</b>	
Average vs good	
Poor vs good	
<b>Health</b>	
Good vs excellent	1.33 (1.07-1.65)
Poor vs excellent	0.96 (0.62-1.49)
<b>Experience of hunger</b>	
Yes vs No	1.15 (0.88-1.52)
<b>Adult conditions</b>	
<b>Education (years)</b>	
No schooling vs post-secondary	1.58 (0.85-2.92)
Primary vs post-secondary	0.98 (0.55-1.74)
Some secondary vs post-secondary	0.69 (0.37-1.30)
<b>Lifetime occupation</b>	
Housewives vs HWC	1.39 (0.72-2.66)
Farmers vs HWC	1.28 (0.66-2.49)
Skilled/Unskilled workers vs HWC	0.92 (0.56-1.49)
LWC vs HWC	0.99 (0.61-1.06)
<b>Current conditions</b>	
<b>Perception of income</b>	
Insufficient vs sufficient	1.47 (1.17-1.84)
<b>Marital status</b>	
Without partner vs with partner	0.80 (0.64-1.01)
<b>Comorbidity</b>	
2 or more conditions vs 0-1	&
<b>BMI</b>	
	1.04 (1.01-1.06)

# RESULTS

**Table 5. Multivariate odds ratios for the relationship between frailty and BMI by gender\***

	Body Mass Index			
	<18.5	18.5-<25	25-<30	>30
	OR (95%CI)			
<b>Sao Paulo</b>				
Women	6.41 (2.02-20.31)	Reference	1.28 (0.92-1.78)	2.66 (1.81-3.89)
Men	2.03 (0.81-5.09)	Reference	0.88 (0.62-1.24)	1.31 (0.73-2.35)

\*All models adjusted by variables in table 4

## CONCLUSIONS

- our results support the hypothesis that disadvantages existing in early life and reproduced along the life course may account for the physical frailty syndrome.
- our results support the hypothesis that women age with higher odds of frailty than men, as has been observed with respect to other health outcomes.
- Theoretical models to explain gender and social differences in frailty should emphasize the use of a life-course perspective.



**Obrigado !**

[roguerra@ufrnet.br](mailto:roguerra@ufrnet.br)