Will Health Inequalities Rise (in Brazil)?
The Role of Aging, Public Spending and Climate Change

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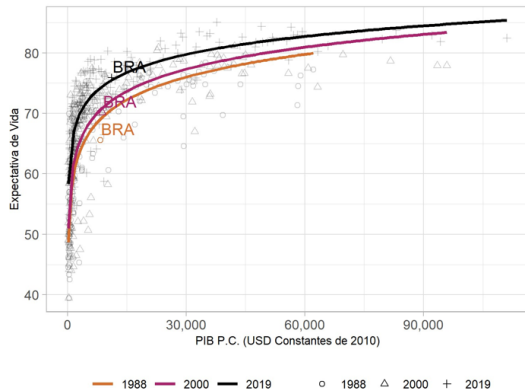
www.rudirocha.org

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Introduction

- Health inequalities on long and continuous reduction, across and within countries.

  ▶ Convergence in life expectancy faster than convergence in per capita income.

  ▶ Most gains from reductions in infectious diseases, infant mortality.

- Challenges ahead put health convergence at risk:

  ▶ Has the low-hanging fruit been picked? Aging, and the complex and expensive burden of chronic diseases.

  ▶ Medical costs, and public spending under fiscal austerity: the rise of the private sector.

  ▶ Climate change will hit the poor the most.

- This is an overview of a research agenda, still focused on Brazil.
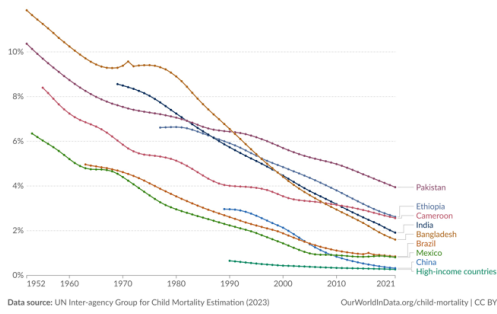
Neonatal mortality rate
The estimated share of newborns¹ who die before reaching 28 days of age.

Data source: UN Inter-agency Group for Child Mortality Estimation (2023)

OurWorldInData.org/child-mortality | CC BY

1. Newborn: A newborn is defined as a baby born alive, and usually refers to neonates – under 28 days old. Read more in our article: How do statistical organizations define age periods for children?

Sources: WDI/WB and Our World in Data.

The Long and Continuous Reduction of Health Inequalities

Sources: WDI/WB and Our World in Data.

Will the convergence in health continue?
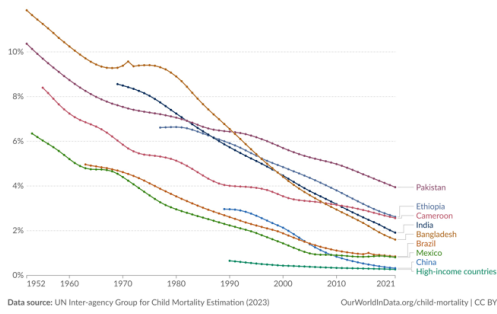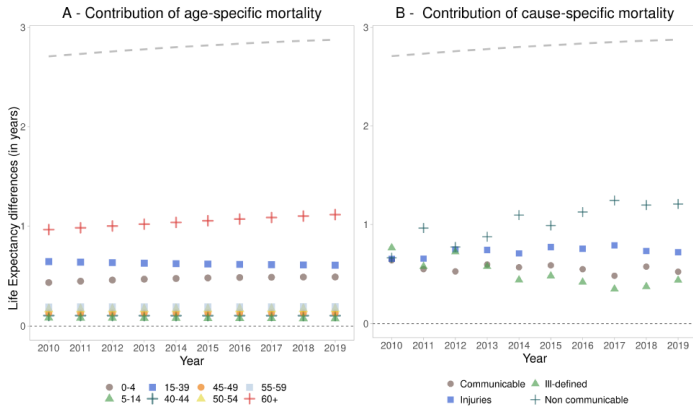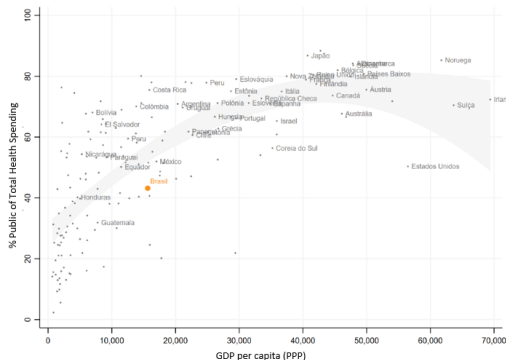
Aging and the Rising Burden of Chronic Diseases
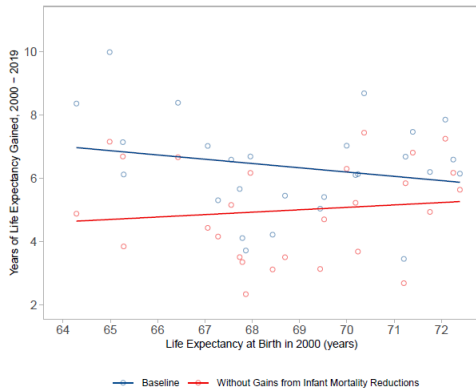
Change in life expectancy 2000-2019 versus life expectancy in 2000, Brazilian states (Szklo, 2022).

Aging and the Rising Burden of Chronic Diseases

Decomposition of differences in life expectancy in the Brazilian Amazon states versus other states of Brazil (Rocha et al. 2022).

Public Spending Constrained, the Rise of the Private Sector

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Financing needs, spending projection, and the future of health in Brazil

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Abstract

In this paper we adopt a growth accounting projection model to estimate and characterize health-financing needs in Brazil as well as to assess the extent to which financing needs may diverge from spending capacity in the future. We estimate an annual increase of 0.71% in the share of projected financing needs relative to GDP, with excess growth rates being 0.74% and 0.69% for the public and private health sectors, respectively. Institutional reforms and public spending restrictions may leverage public–private segmentation in health financing throughout the next decades, thus potentially leading to losses of equity in the system. Our projections contribute to a scant empirical literature on health financing sustainability in low- and middle-income countries and shed light on the role of spending capacity and institutional constraints over the path towards universal health coverage.

KEYWORDS
fiscal constraints, health expenditures, health system sustainability, projection models

JEL CLASSIFICATION
H51, I13, I18, J11

# Public Spending Constrained, the Rise of the Private Sector

TABLE 2 Health financing needs: Main projections

| Parameters	Observed Spending (% of GDP)		Projected Needs (% of GDP)			Δ 2017–2045 (in p.p.)	Δ 2017–2060 (in p.p.)	CAGR 2017–2060
	2000	2017	2030	2045	2060			
Base scenario								
Total	8.2%	9.2%	10.8%	12.0%	12.5%	2.78	3.29	0.71%
Public	3.5%	3.9%	4.5%	5.1%	5.3%	1.21	1.44	0.74%
Private	4.7%	5.4%	6.3%	7.0%	7.2%	1.57	1.85	0.69%
Residual								
Total: −0.75	–	9.2%	9.9%	10.0%	9.4%	0.76	0.19	0.05%
Total: +0.75	–	9.2%	11.8%	14.5%	16.7%	5.22	7.45	1.39%
Cost curve								
All public	–	9.2%	10.6%	11.7%	12.2%	2.47	2.95	0.65%
All private	–	9.2%	11.2%	12.7%	13.3%	3.48	4.06	0.85%
GDP growth								
0.8% Annual	–	9.2%	10.9%	12.5%	13.2%	3.23	3.96	0.83%
2.8% Annual	–	9.2%	10.7%	11.8%	12.2%	2.61	2.99	0.65%

Note: Data on past health expenditure is available for 2000–2017. Projections are estimated annually for the period 2018–2060. Health care expenditure is expressed relative to GDP. The third and second columns from the right show, in percentage points, the difference between the projected health spending in 2045 and 2060, respectively, and the observed health spending in 2017. The last column presents the compound annual growth rate (CAGR) of health expenditure as % of GDP during the 2017–2060 period. Each of the scenarios are detailed in Table 1.
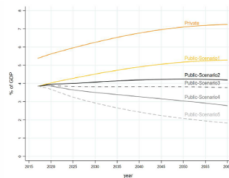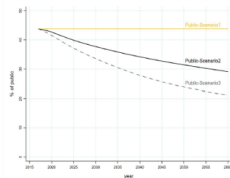

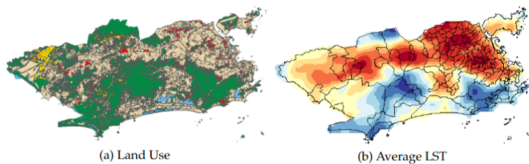**(a)** Health Expenditures as % of GDP
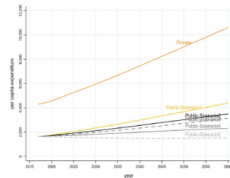
(b) Per Capita Health Spending
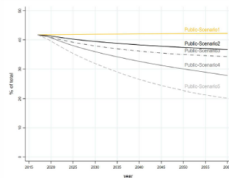
(c) Public vs. Private Composition

(d) Share of Federal Health Spending

Source: Rocha, Furtado and Spinola (2021)

Climate Change, Poverty and Health

Figure A1: Rio de Janeiro: Land Use and Heat Map

(a) Land Use   (b) Average LST

Data on land use are publicly available from Institute Pereira Passos data lake (data.rio). We construct average LST at the pixel level over the entire period of analysis.

Table 3: Heterogeneous effects of Temperature on Mortality

Shock	Mortality Rate (per 100,000 individuals aged 60+)		
	(1)	(2)	(3)
Number Days > 40C	1.149 (0.314)***	1.662 (0.534)***	4.394 (1.923)**
Greater 40 x inc. per capita	−0.231 (0.152)		
Greater 40 x % pop. greater 1 min. wage		−0.017 (0.009)*	
Greater 40 x SES index			−6.105 (3.187)*
Bairro x Year	✓	✓	✓
Bairro x Month	✓	✓	✓
Controls	✓	✓	✓
Observations	23,016	23,016	23,016
Mean dep. var.	181.0	181.0	181.0

Notes: Data is a monthly panel of neighborhoods. Each column is a regression with a different socioeconomic variable interacted. In column (1) we interact the temperature shock with the income per capita of the neighborhood, in column (2) with the percentage of people who have income per capita greater than one monthly minimum wage, and in column (3) with an index of socioeconomic development of the neighborhood created by Rio's City Hall from 2010 Census Data – higher value means a better socioeconomic environment. Chronic deaths are defined as diseases of the circulatory system (Chapter I), respiratory system (Chapter J) and endocrine, nutritional and metabolic diseases (Chapter E).
Standard errors clustered at neighborhood level in brackets. All regressions are weighted by the population aged 60+ in each neighborhood. All equations control for the number of daily LST missing observations in the neighborhood-month.

Source: Peçanha, Rocha and Szerman (2024)

Research Agenda

- Research agenda:
  - ▶ Applied econometrics, causal identification; Brazilian data.
  - ▶ Mapping of empirical/causal patterns and inequalities. Policy impact evaluations.

- Policy response: how to respond to challenges ahead?
  - ▶ Health system design and resilience: more coordination, less fragmentation.
  - ▶ Climate change: global challenges, local actions.

- Research/policy challenges and the available data make interdisciplinary work extremely relevant (and interesting!).