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Mortality selection among adults in Brazil: the survival advantage of Air Force Officers

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Background

- The interest on disentangling pathways to lower mortality have found mortality advantages related to several dimensions:
 - (Not surprising) factors: income, educational attainment, occupational status, gender, race groups, marital status and health measures
 - (Surprising) factors: ethnicity/nativity
 - Selected population subgroups living in special contexts: learned societies, religious groups and the MILITARY

Background

- Military Mortality:
 - Officers experience lower mortality than many groups in society, even in the context of war
 - Buzzel & Preston 2007: Young black males in Philly have mortality rates 9% higher than troops in Iraq.
 - MacIntyre 1978: Pilots (WWII and Korean war) had lower all-cause and cause-specific mortality (cardiovascular, cancer) than the US Civilian population
 - **Healthy Soldier Effect: selection bias at recruitment** (McLaughlin 2008, Shah 2009)
 - **The association of early life infections, and stressful situations with mortality later in life** (Costa & Kahn 2010; Costa 2003)
 - **Association of body build, nutrition, and mortality** (Costa and Fogel 2004)

Background

- Brazil:
 - Lack of high quality data and longitudinal mortality studies
 - Lack of historical high quality data (insufficient to study demographic and epidemiological transitions)
 - Little information on SES gradients in mortality
 - **Cohort of Air Force officers represent selected adult subgroup:**
 - Individuals from above average income, born during the first stages of the demographic transition (average 1935)
 - Selection at enlistment and training
 - Share similar social experiences and standardized careers (“reengineering a social context”)

Research Questions

- How large is the survival advantage of Brazilian Officers?
- Are early life conditions (place of birth) associated with survival later in life? Do health selection and health conditions over the life course offset potential differences at birth?

Data

- Retrospective longitudinal mortality data from 1947 to 2013 (n=706, 66 years follow-up), for Air Force male officers (BAF)
- Carrer (Pilot/administrative), place of birth (Northern and Southern regions), causes of death (on duty, other causes). **All retrieved from the pension fund system**
- Human Mortality Database (for selected low mortality countries)
- 1950-2015 UN life tables and 2000 oficial mortality data for Brazil (IBGE)

Data

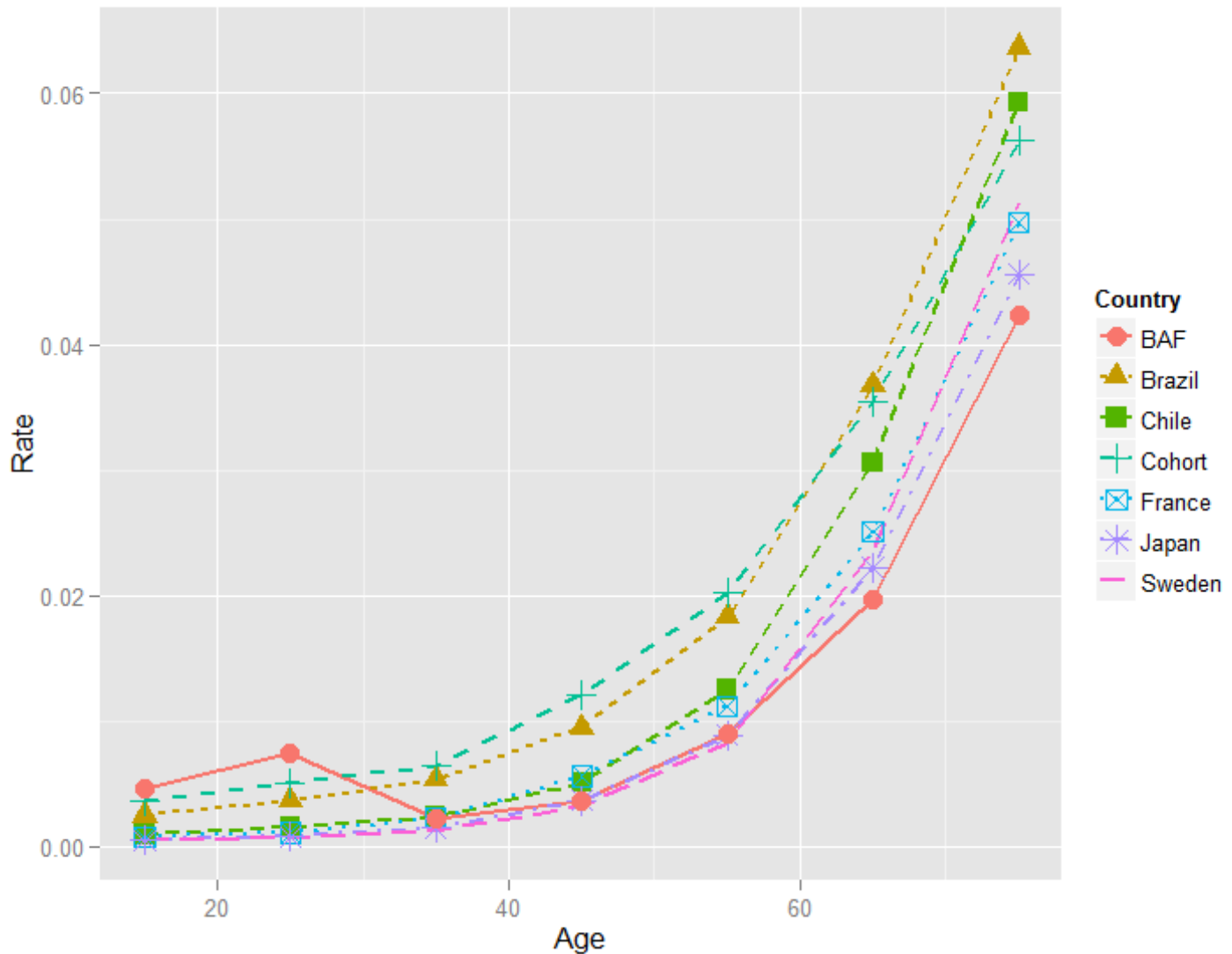


Methods

- Research Question 1 (Mortality levels):
 - Predict age-specific death rates from the coefficients of Poisson modeling that controls only for age;
 - Estimate truncated life expectancy at age 80 for BAF, Brazil (period and cohort), Chile, Sweden, France and Japan

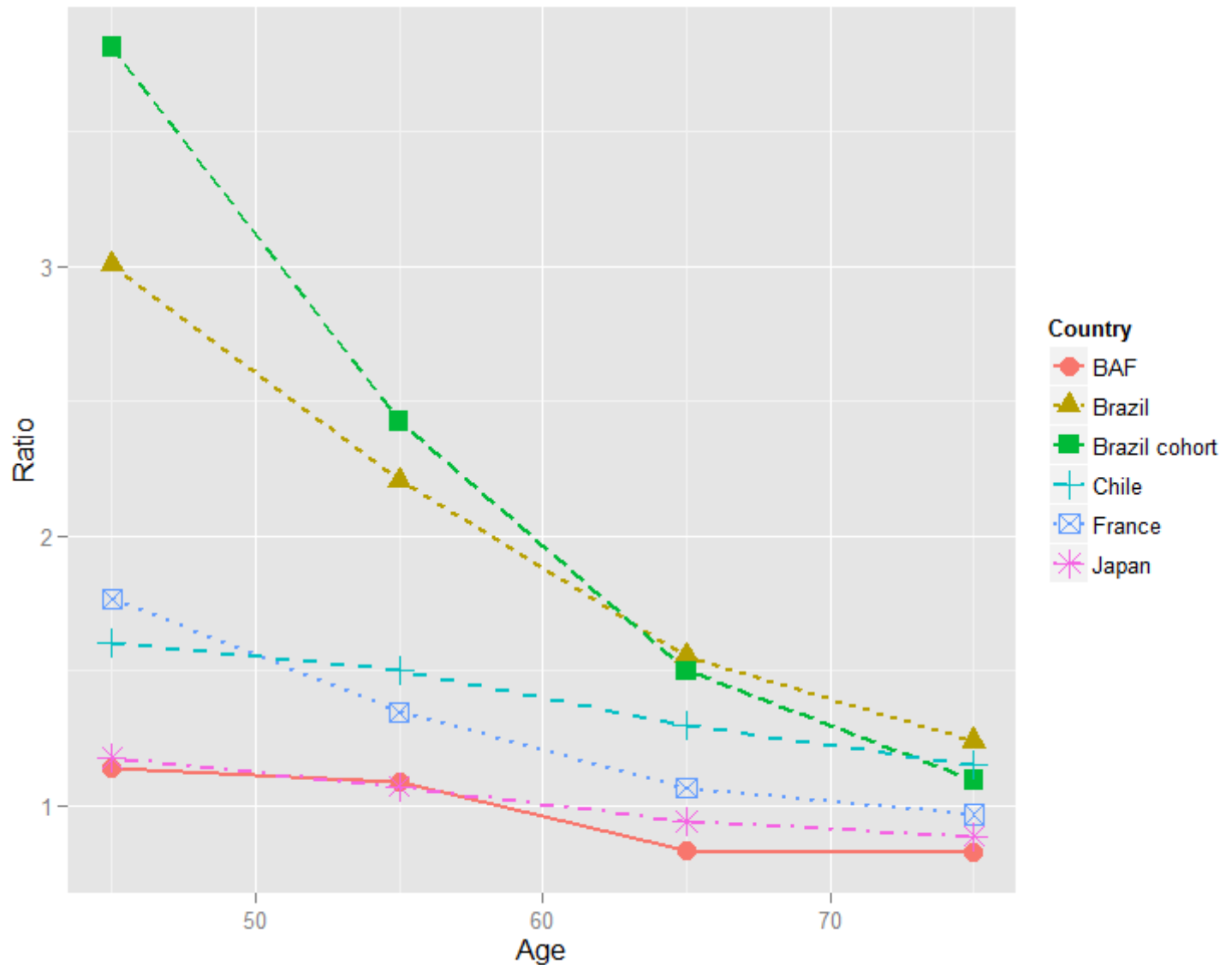
Results

Figure 1. Male age-specific mortality rates, BAF and selected countries, 2000



Results

Figure 2. Male mortality ratios, BAF and selected countries (Sweden standard)



Results

Truncated male life expectancies at age 80

Age	95% Confidence Level			Brazil 2000	Brazil 1935 cohort	Sweden
	Upper	Average	Lower			
45	32.92	30.25	25.28	25.68	25.91	30.43
55	23.29	21.16	17.35	17.85	18.58	21.22
65	13.95	12.67	10.43	10.73	11.60	12.57
75	4.70	4.33	3.81	4.04	4.38	4.46

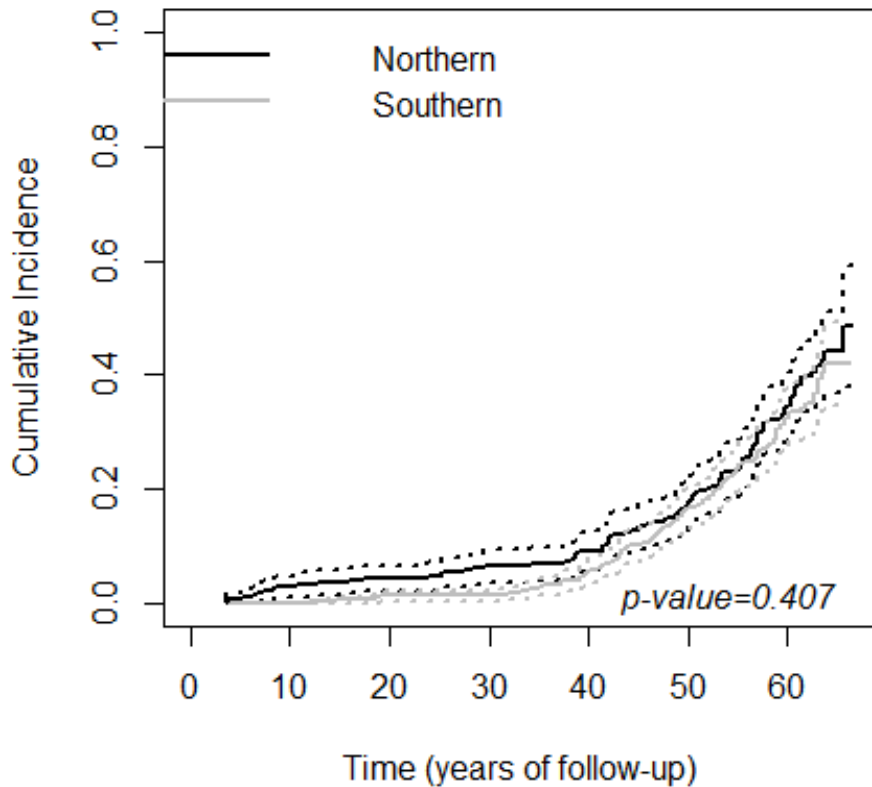
Methods

- Research Question 2 (early life conditions):
- Cause-specific cumulative incidence function (CIF), a non-parametric curve that provides cause-specific mortality hazards in presence of other causes;
- Fine and Gray (FG) regression to model the underlying hazard: partial likelihood + weighting principles= competing risks need not be proportional and independent
- Compare mortality from casualties and other causes by place of birth, controlling for career

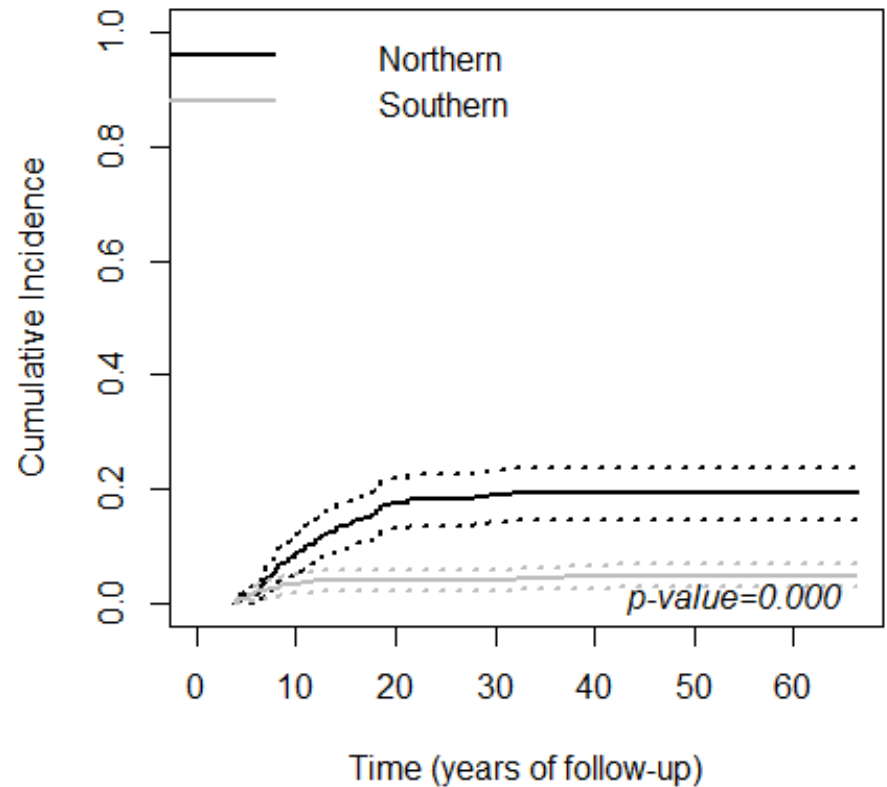
Results

Cumulative Incidence Functions by regions of birth and causes of death

**CIF's by Region
Other Causes of Death**



**CIF's by Region
Casualties**



Results

FG regression coefficients for region of birth, career and causes of death

Deaths by Other Causes			Deaths by Casulties	
	Model 1	Model 2	Model 1	Model 2
Region of birth				
Southern	-	-	-	-
Northern	0.1272	0.1417	1.4596***	1.4596***
Carrer				
Administrative		-		-
Pilot		(-0.6390)***		2.1867**

* $p < .05$; ** $p < .01$; *** $p < .001$

Discussion

- Lower bounds of mortality rates among BAF males in Brazil comparable to rates for the leading low mortality countries
- There is no threshold for life expectancy ?
- No advantage for officers born in the most developed regions: selection, equalized life conditions (is it never too late to catch up?) or both? – offsetting scarring effects?
- Disadvantage for Northern pilots: self-selection of institutional-based selection?

Discussion

- Future research: include data for more recent cohorts to examine whether the patterns remain true in a context of rapid transitions (including transitions in the Military!) and include health data!
- What factors are associated to selection in a developing country scenario?

THANK YOU!

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