The Association between Frailty and Health Care Use from a Population Health Perspective Using Data from the Canadian Longitudinal Study on Aging

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Canadian Longitudinal Study on Aging
Étude longitudinale canadienne sur le vieillissement

What is Frailty?

- State of increased vulnerability to declining health status and adverse health outcomes, including mortality and institutionalization
- Complex, involves multiple systems, and changes over time
- Lack of resilience, or impaired ability to rebound from stressors
- Becomes more common with aging

Frailty Measurement

Frailty was measured using the accumulated deficit approach, which involves 3 steps:

1. Identify a list of health deficits that (Searle et al, 2008):
   - Relate to age and health status
   - Do not saturate too early
   - Cover a range of systems (physical, psychological, chronic conditions)
2. Rescale the deficits to variables ranging from 0 (no deficit) to 1 (most severe deficit)
   1. Binary variables are coded as 0 or 1
   2. Ordinal variables are assigned weights on this scale
      e.g. for self-rated health:
      0=Excellent 0.25=Very good 0.5=Good 0.75=Fair 1=Poor
   3. Continuous variables are transformed or cut-offs are used to define binary deficits
3. The Frailty Index is calculated as:
   - **The sum of deficits in the individual, divided by the number of potential deficits**

Deficits in the CLSA

- Deficits were selected based on literature and discussion with an expert panel to form the index of 90 items*
  - Physical function tests (5 items) (*Comprehensive only)*
  - Self-reported functional status (14 items) (*Tracking only)*
  - Self-rated general health
  - Self-rated mental health
  - Eyesight rating
  - Hearing rating
  - Satisfaction with Life Scale (SWLS) (5 items)
  - Depressive symptoms (CES-D 10) (10 items)
  - Cognitive function tests (4 items)
  - Activities of daily living (OARS scale) (14 items)
  - Social participation prevented by health
  - Body mass index
  - Chronic conditions (32 items)

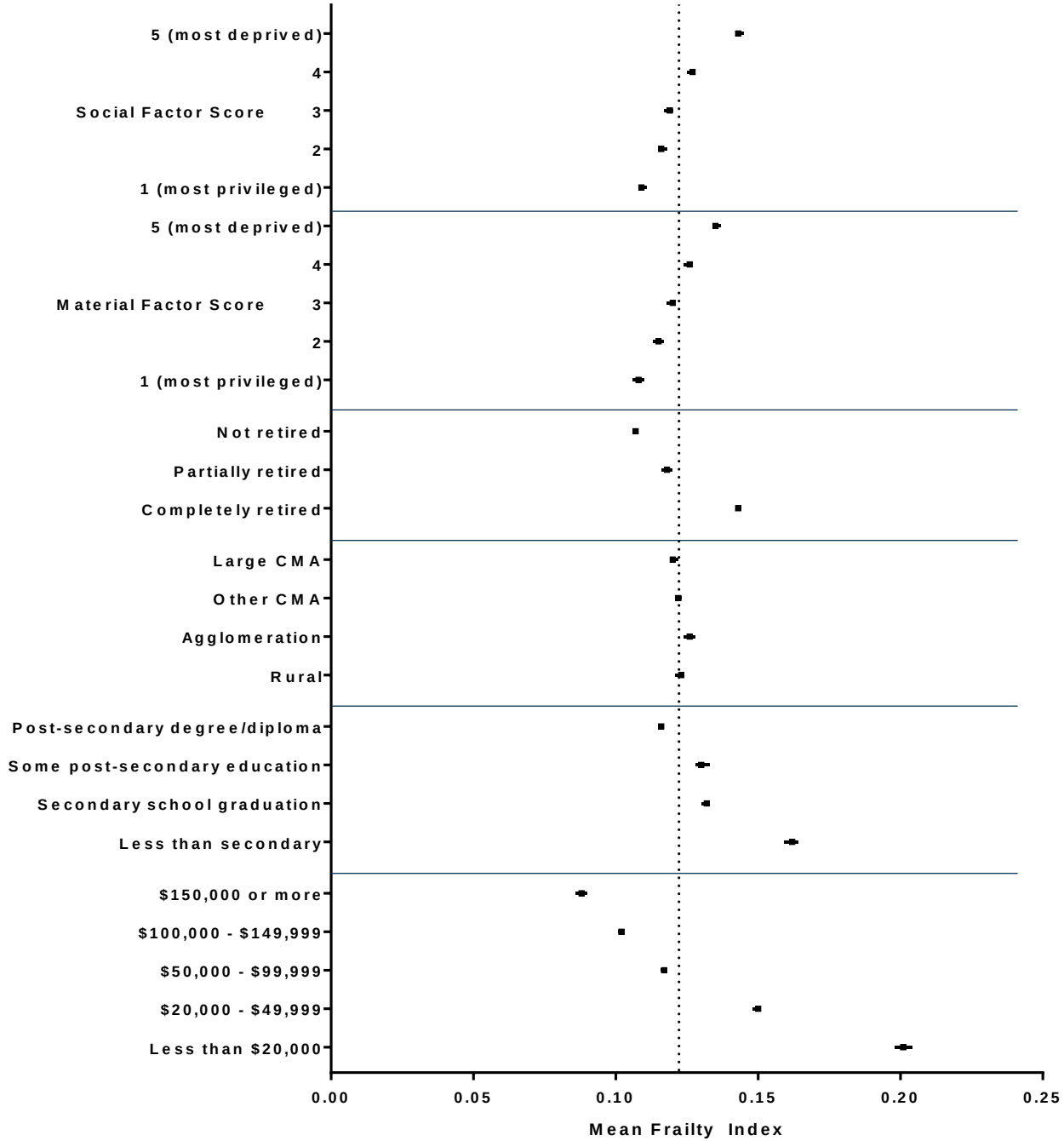
**76 items in the Comprehensive cohort, 85 in Tracking*

Paper 1: Frailty Differences Across Population Characteristics Associated with Health Inequality

SOCIAL STRATIFIERS	**SOCIOECONOMIC STATUS** • Income • Education • Employment • Occupation • Material and social deprivation	**INDIGENOUS PEOPLES** • First Nations • Inuit • Métis	**PLACE OF RESIDENCE** • Rural/Urban	**POPULATION GROUP** • Age • Immigrant status • Sexual orientation • Functional health • Cultural/racial background
	SEX: Male or Female			
	JURISDICTION: National or Provincial/Territorial			

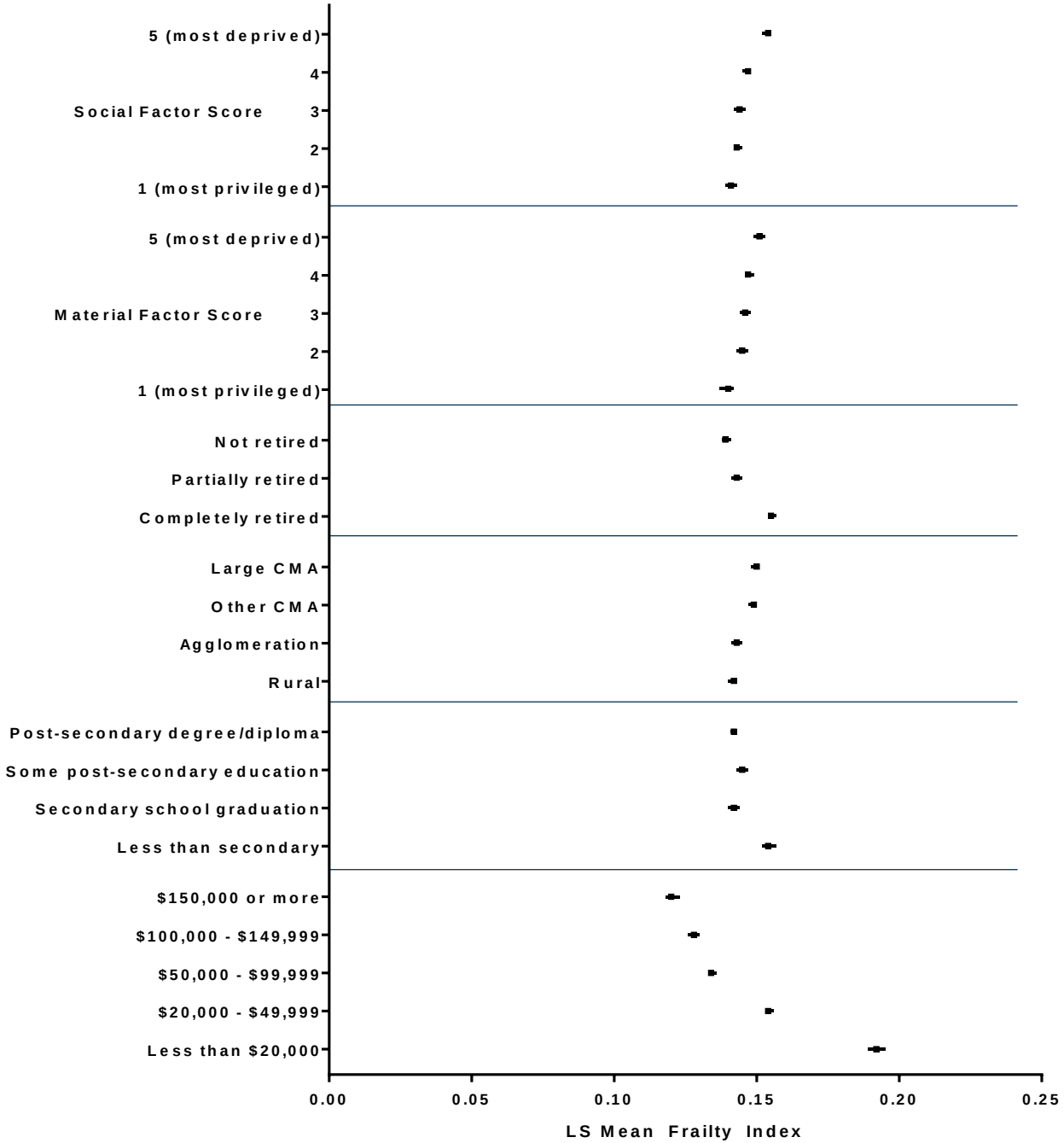
From: Pan-Canadian Health Inequalities Reporting Initiative: Key Health Inequalities in Canada - A National Portrait

Sources of Heterogeneity unadjusted



Mean Frailty (population)

Sources of Heterogeneity fully adjusted



Objective

- Examine the association between frailty and health care use from a population health
- Participants were assessed for use of the following types of healthcare in past 12 months:

Emergency Department

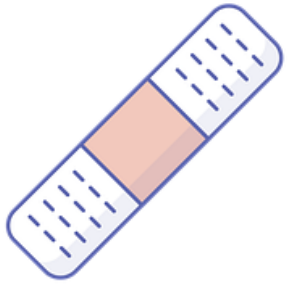
Hospital Admission

Family Physician

Specialist Physician

Formal (paid) Home Care

Informal Home Care



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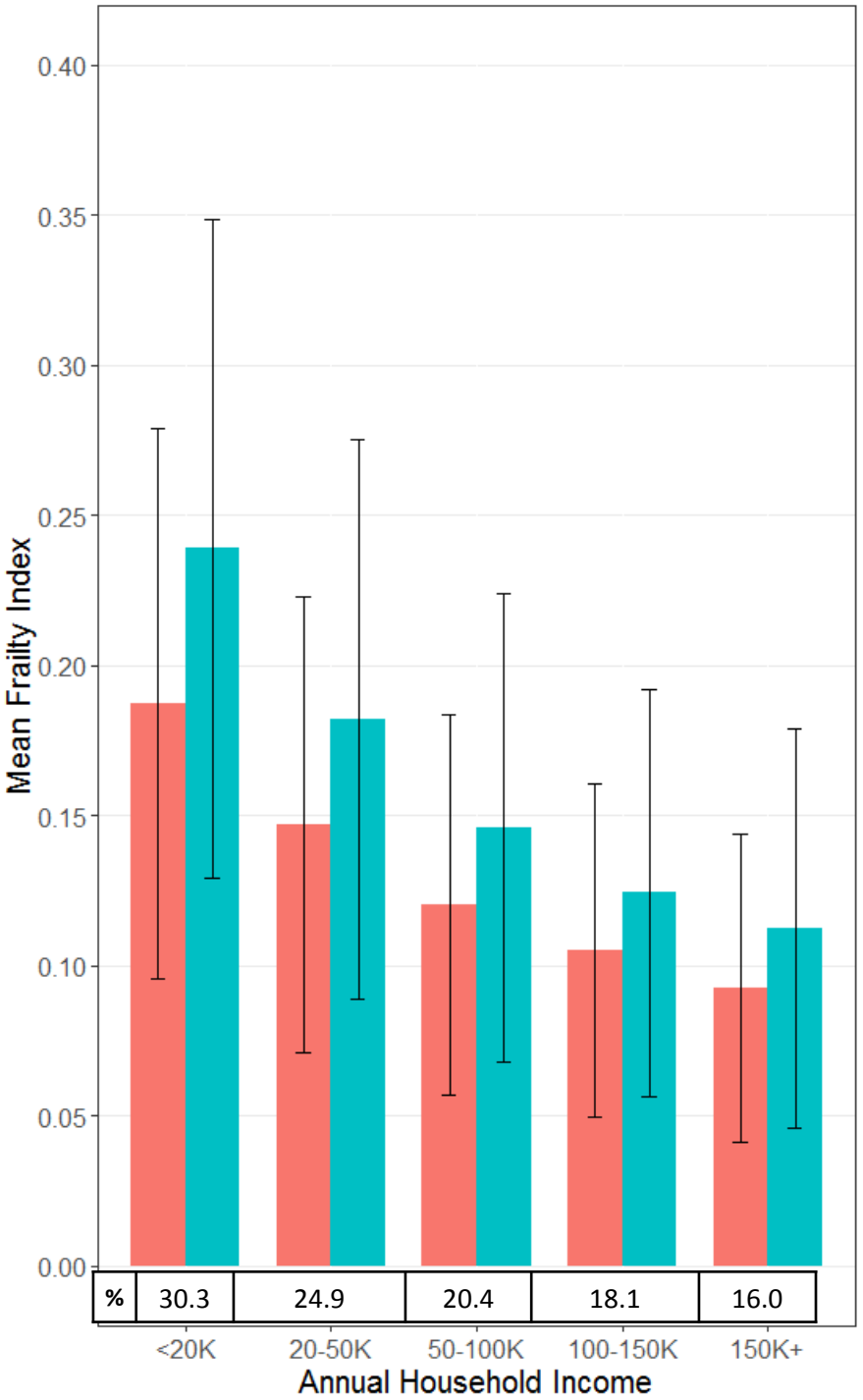
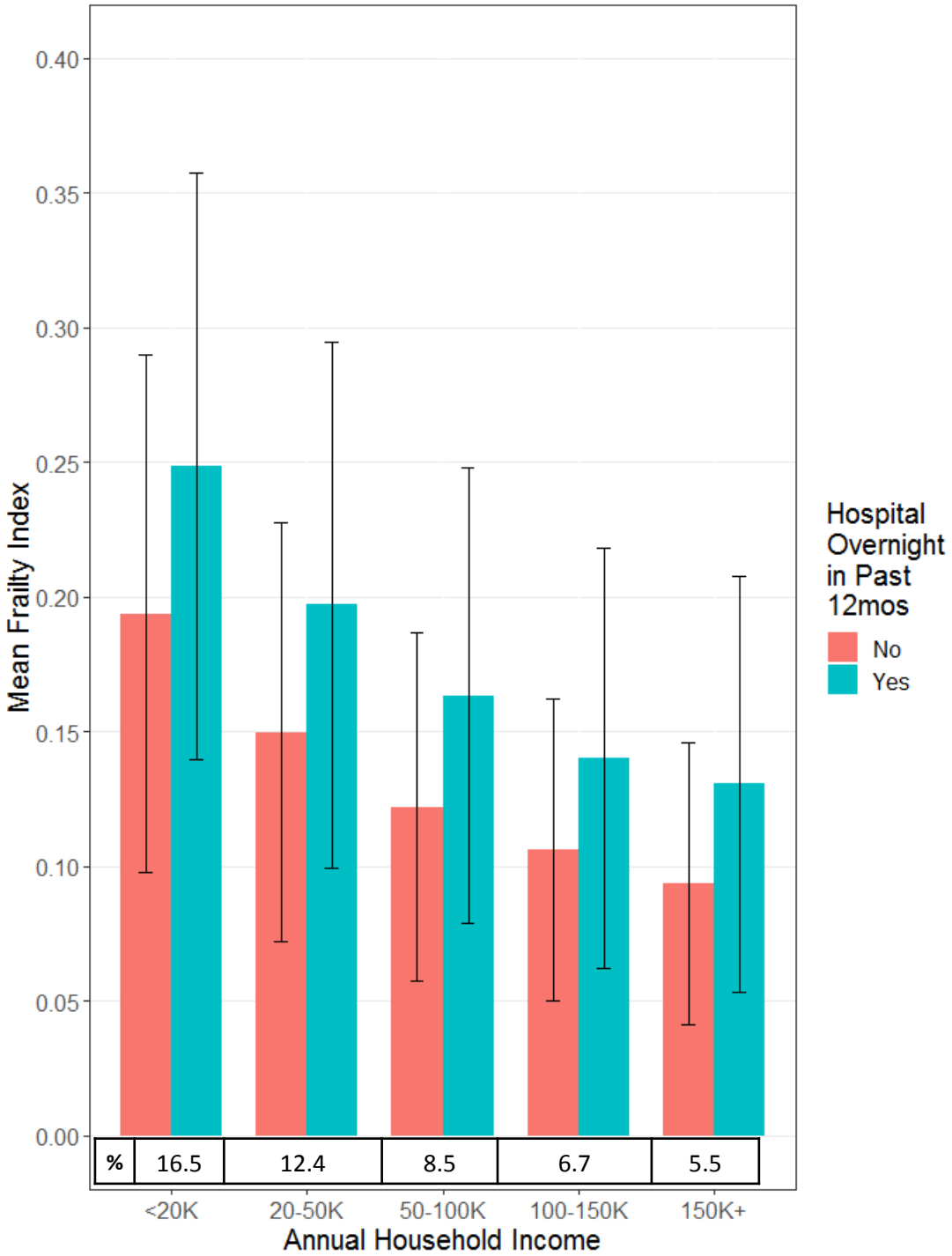
Methods

- Estimated the prevalence of each type of health care use
- Examined the average frailty among participants who used each type of health care, compared to those who did not.
- Estimated the association between each type of health care and a 1% increase in Frailty Index
  - Risk Difference (RD) calculated using linear binomial regression
  - Risk Ratio (RR) calculated using logistic binomial regression
  - Each adjusted for sex and education
- Regression analyses were stratified by annual household income

Results

Mean Frailty Index by Income, Stratified by Health Care Use Status





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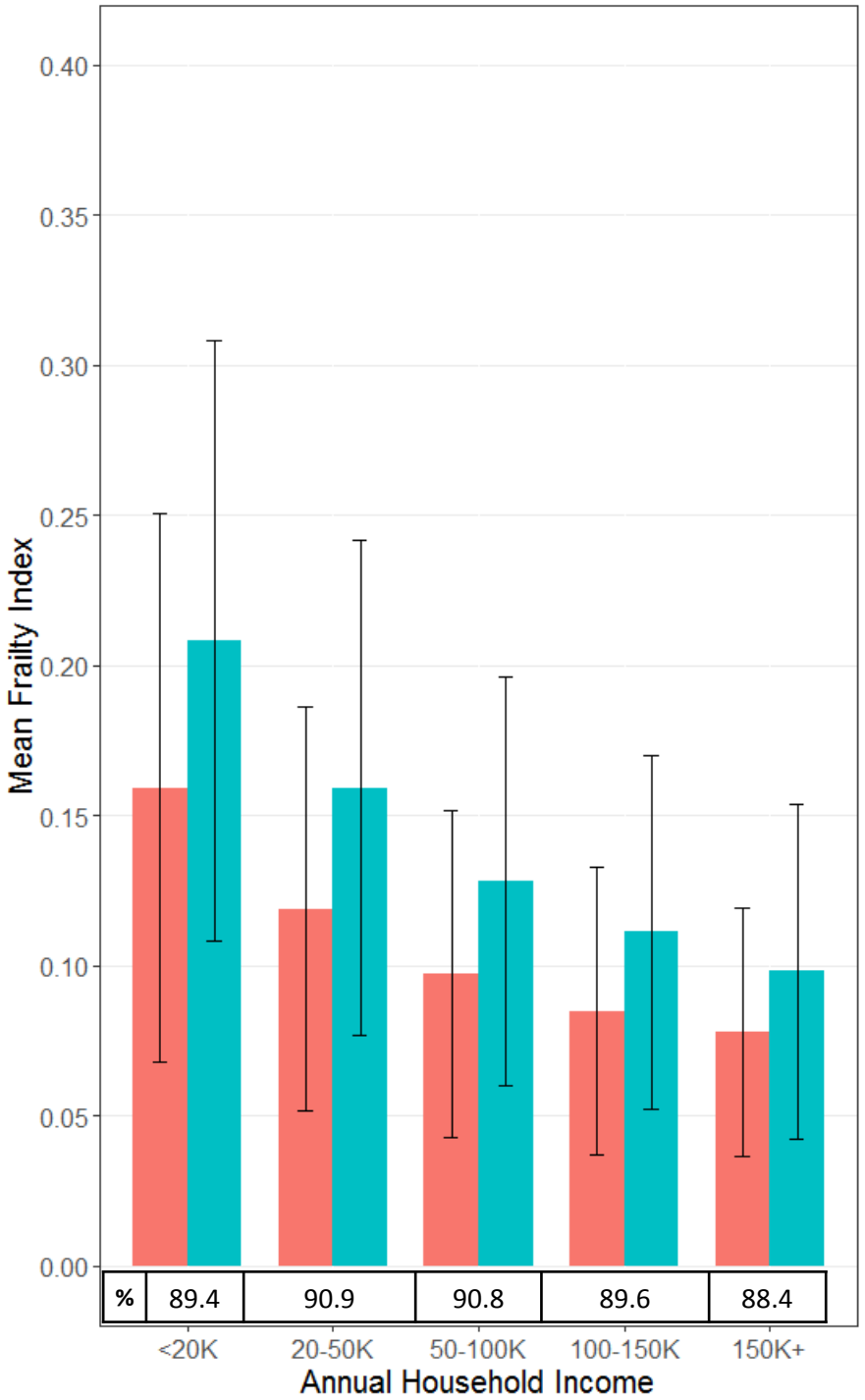

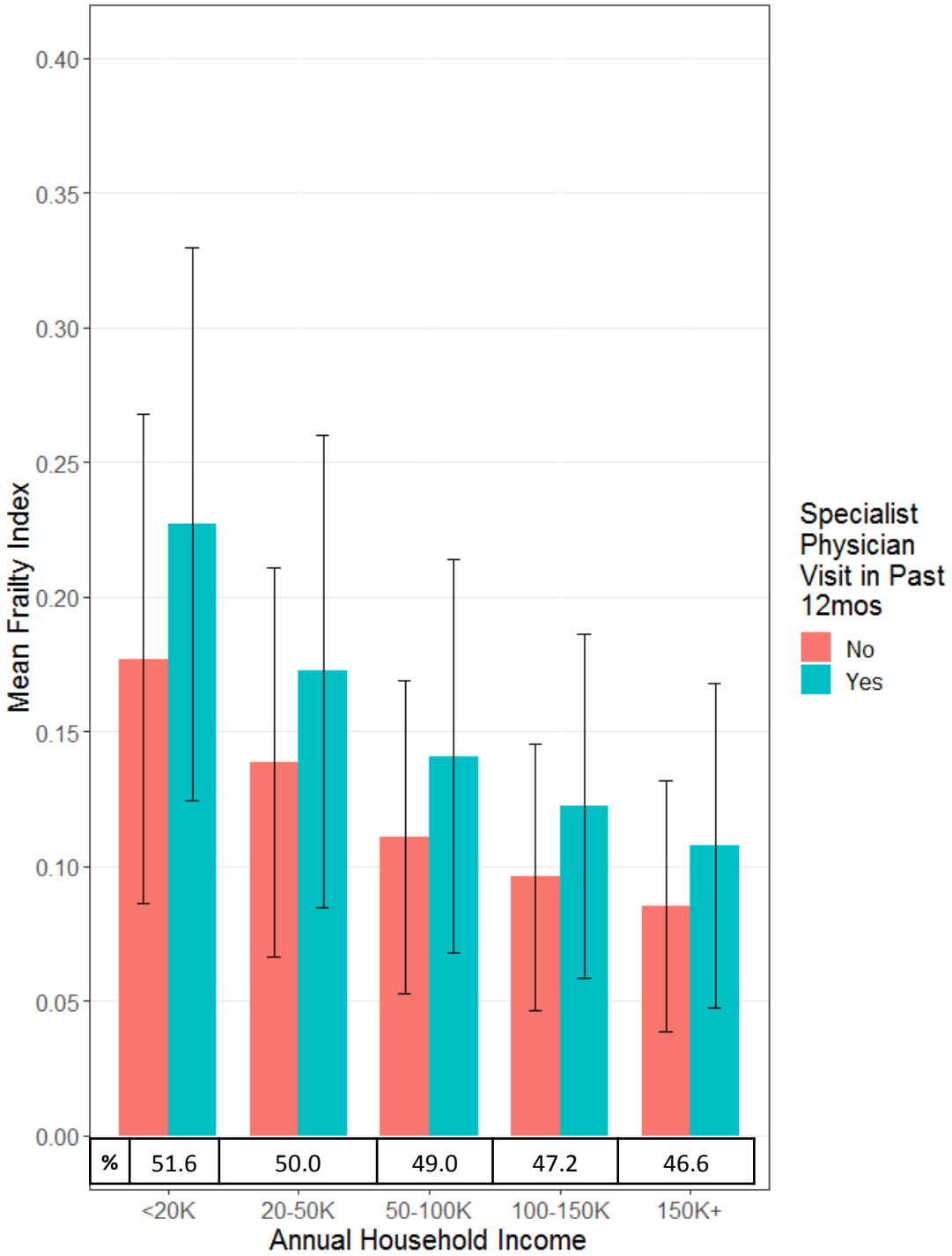

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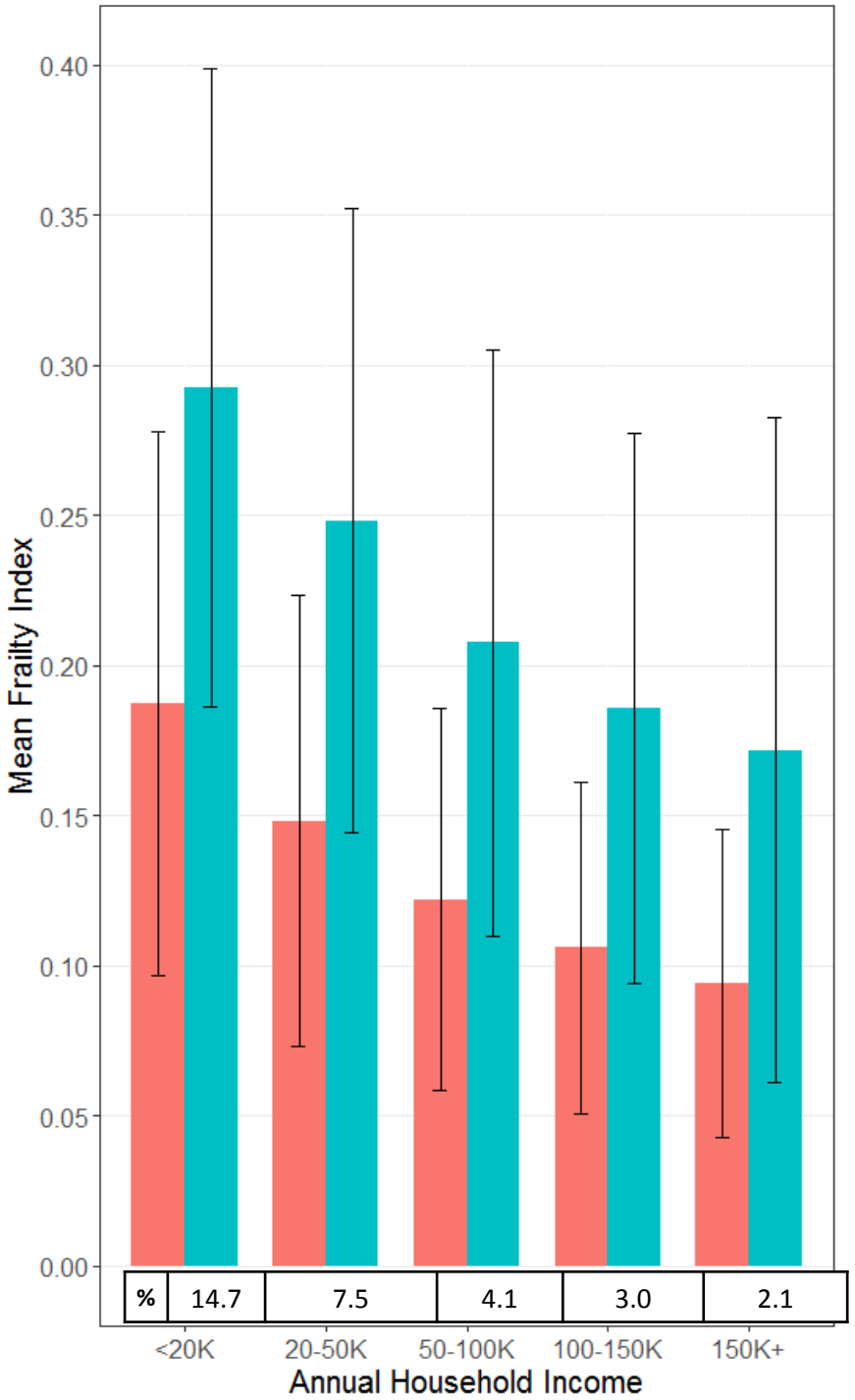
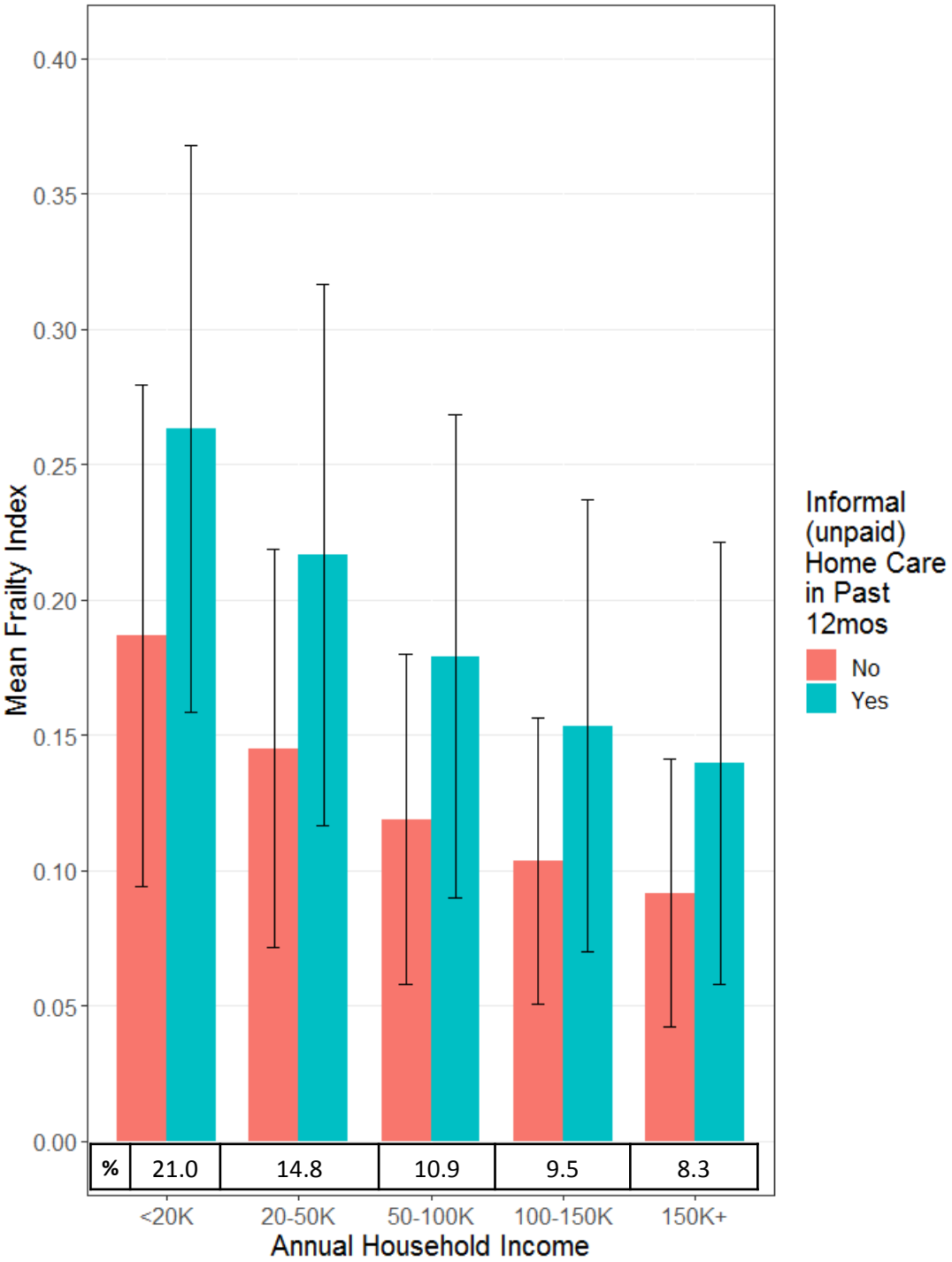
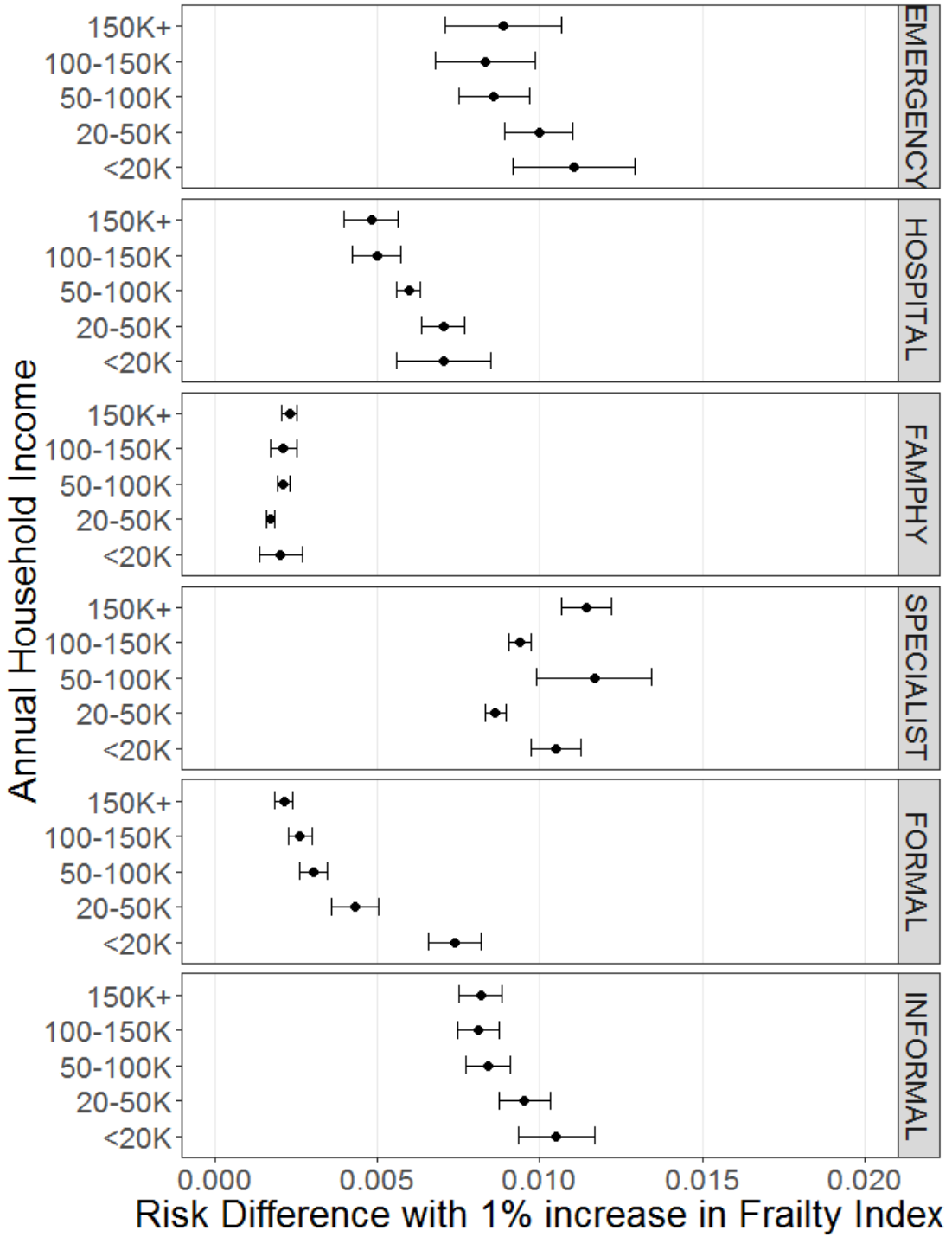




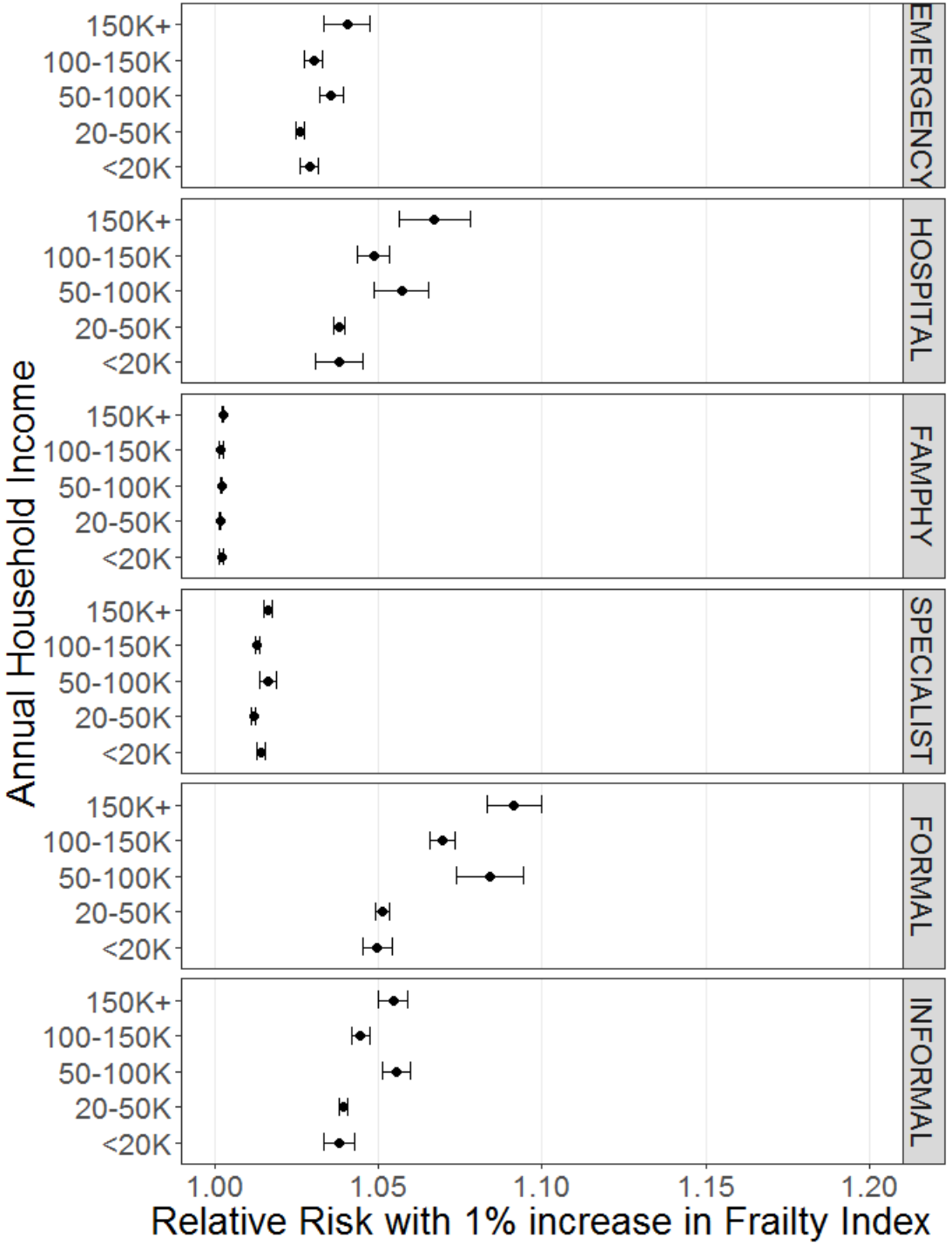
Results

- A 1% (or 0.01 unit) increase in Frailty Index is associated with an increase of 0.01%-1.4% in the probability of using one of these types of healthcare services in the past year.
- Risk difference for Emergency, Hospital, and Home Care for change in Frailty was associated with income
- Risk difference for Family Physician and Specialist visits were not associated with income.



Results

- With a 1% (or 0.01 unit) increase in Frailty Index, the probability of a participant having used one of these types of healthcare services in the past year is increased by a factor of by 1.01-1.10.
- Decreasing Risk Ratio for Emergency, Hospital, and Home Care with change in Frailty was associated with income
- Decreasing Risk Ratio for Family Physician and Specialist visits were not associated with income.



Conclusion

- Frailty is associated with both income and health care use.
  - The association between certain types of health care services and frailty is stronger in low-income compared to high-income participants.
- The use of certain health care services is more common among low-income participants.
- Absolute measures of association (Risk Difference) are more appropriate for these comparisons than relative measures of association (Relative Risk or Odds Ratio).
  - Relative measures show an inverse relationship between frailty and health care use.

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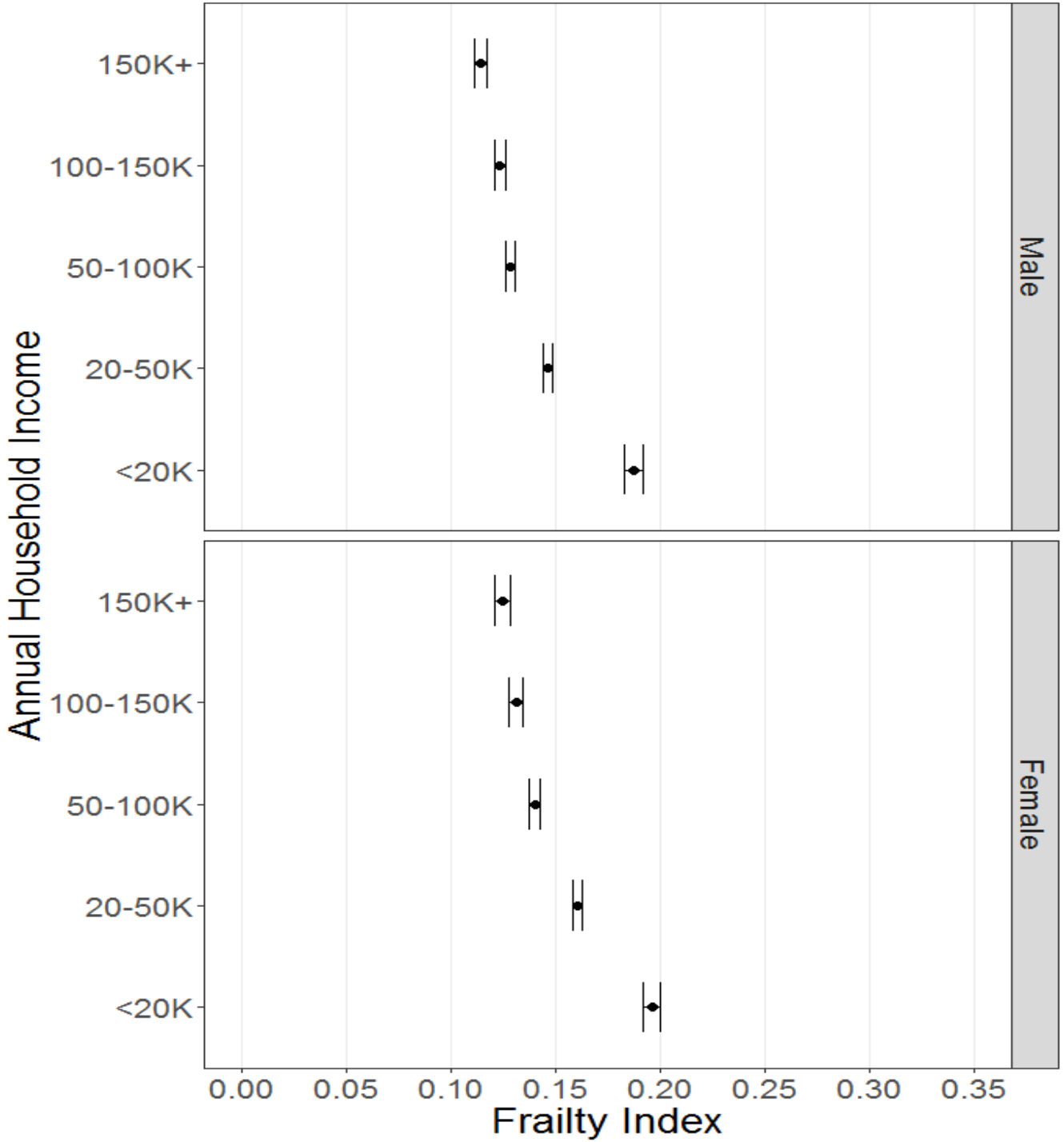
Extra Slides

Annual Household Income	Health Care Use in Past 12 months					
	Emergency Department n (%)	Hospital Overnight n (%)	Family Physician n (%)	Specialist Physician n (%)	Formal Home Care n (%)	Informal Home Care n (%)
Less than $20,000	984 (30.3)	535 (16.5)	2902 (89.4)	1675 (51.6)	478 (14.7)	682 (21.0)
$20,000 or more, but less than $50,000	3314 (24.9)	1658 (12.4)	12116 (90.9)	6669 (50.0)	1001 (7.5)	1968 (14.8)
$50,000 or more, but less than $100,000	3734 (20.4)	1549 (8.5)	16613 (90.8)	8960 (49.0)	746 (4.1)	2001 (10.9)
$100,000 or more, but less than $150,000	1658 (18.1)	613 (6.7)	8197 (89.6)	4312 (47.2)	278 (3)	865 (9.5)
$150,000 or more	1170 (16.0)	400 (5.5)	6476 (88.4)	3412 (46.6)	156 (2.1)	608 (8.3)

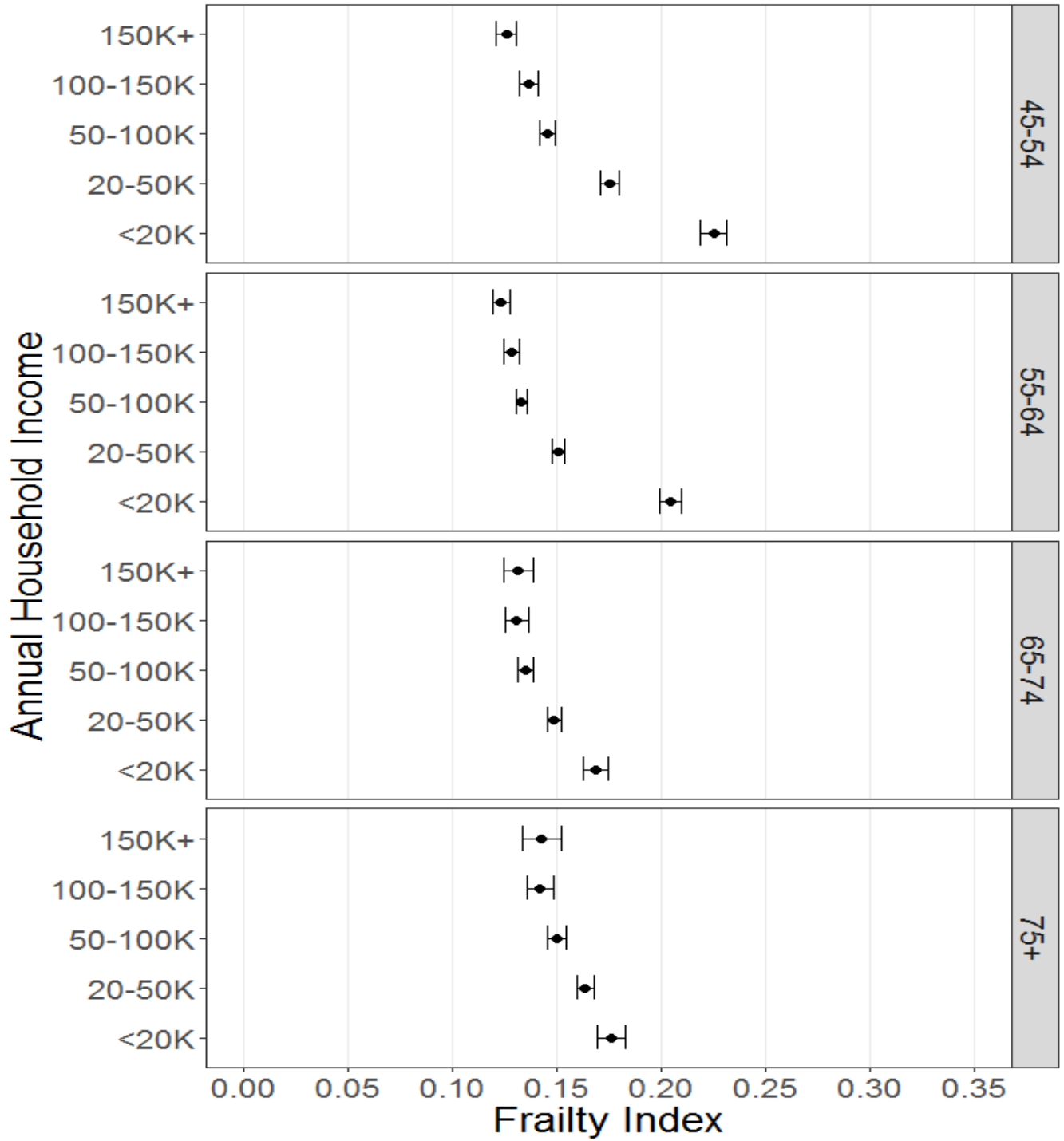
Health Inequalities Available in CLSA

- Sex
- Age
- Income
- Education
- Retirement
- Population density (urban vs. rural)
- Marital status
- Pampalon Index – Material Factor Score
- Pampalon Index – Social Factor Score
- Social isolation
- Loneliness/living alone
- Nutrition
- Smoking

Annual household income fully adjusted, stratified by sex



Annual household income fully adjusted, stratified by age



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