Effect of incident stroke on the risk of dementia over a period of 10 years of follow-up in a cohort of Asian American and White older adults in California

L. Paloma Rojas-Saunero, Yixuan Zhou, Eleanor Hayes-Larson, Yingyan Wu, Elizabeth Rose Mayeda

Department of Epidemiology

UCLA Fielding School of Public Health

Motivation

- Stroke can precipitate pathological changes in the neurovascular unit leading to loss of structural and functional connectivity that could increase dementia risk.

Motivation

- Stroke can precipitate pathological changes in the neurovascular unit leading to loss of structural and functional connectivity that could increase dementia risk.
- Studies on this topic have very selected samples with minimal (if any) representation of the Asian American population.

Motivation

- Stroke can precipitate pathological changes in the neurovascular unit leading to loss of structural and functional connectivity that could increase dementia risk.
- Studies on this topic have very selected samples with minimal (if any) representation of the Asian American population.
- Previous work had major methodological limitations, including how to account for the fact that stroke increases mortality, which competes with dementia.

Research question

- What is the effect of incident stroke in the 10-year-risk of dementia across different Asian American ethnicities and White populations, if we could remove the effect of stroke on death?

Research question

- What is the effect of incident stroke in the 10-year-risk of dementia across different Asian American ethnicities and White populations, if we could remove the effect of stroke on death?
- What is the total effect of incident stroke in the 10-year-risk of dementia across different Asian American ethnicities and White populations?

Study population

- **Study sample:**
  - Kaiser Permanente Northern California members who participated on the California Men's Health Study (CMHS) or the Kaiser Permanente Research Program on Genes, Environment and Health Survey (RPGEH) who self-identified as Asian Americans or White.

Study population

- **Study sample:**
  - Kaiser Permanente Northern California members who participated on the California Men's Health Study (CMHS) or the Kaiser Permanente Research Program on Genes, Environment and Health Survey (RPGEH) who self-identified as Asian Americans or White.
- **Eligibility criteria:**
  - With no history of stroke
  - With no history of dementia
  - From 60 to 89 years old

Study Design

- **Exposure:** Incident stroke (ischemic stroke, hemorrhagic stroke)
- **Outcome:** Incident dementia diagnosis (Alzheimer's disease, vascular dementia, and non-specific dementia diagnosis)
- **Time zero/Baseline:** Time of survey
- **End of follow-up:** Time of dementia diagnosis, time of death prior to dementia diagnosis, turning 90 years old

Covariates

Time-fixed covariates

- Age at survey
- Sex/gender
- Nativity status
- Educational attainment
- Health status
- Smoking status

Covariates

Time-fixed covariates

- Age at survey
- Sex/gender
- Nativity status
- Educational attainment
- Health status
- Smoking status

Time-varying covariates

- Systolic blood pressure (median value/year)
- BMI (median value/year)
- Cholesterol (median value/year)
- Incident diabetes
- Incident hypertension
- Incident myocardial infarction
- Incident congestive heart failure
- Incident cancer

Statistical Analysis

Weights calculation

- **Inverse probability weights for stroke (IPTW):** so that those who have a stroke and those who don't are comparable at every time-point before stroke.

Statistical Analysis

Weights calculation

- **Inverse probability weights for stroke (IPTW):** so that those who have a stroke and those who don't are comparable at every time-point before stroke.
- **Inverse probability weights for death over follow-up (IPCW):** to make participants who remain alive after stroke comparable to the no-stroke group over follow-up.

Statistical Analysis

Direct effect: Plug IPTW x IPCW in a Kaplan-Meier estimator.

Statistical Analysis

Direct effect: Plug IPTW x IPCW in a Kaplan-Meier estimator.

Total effect: Plug IPTW in an Aalen-Johannsen estimator.

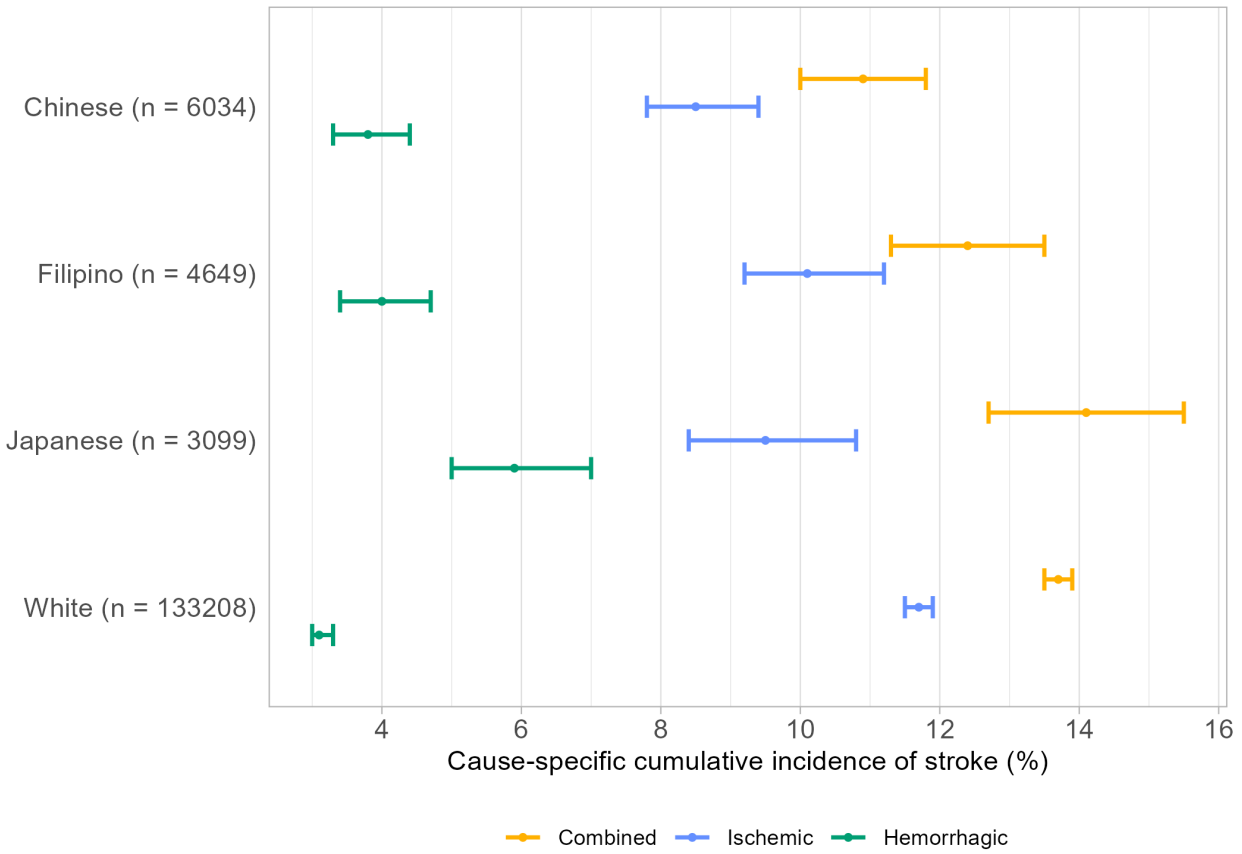
Statistical Analysis

Direct effect: Plug IPTW x IPCW in a Kaplan-Meier estimator.

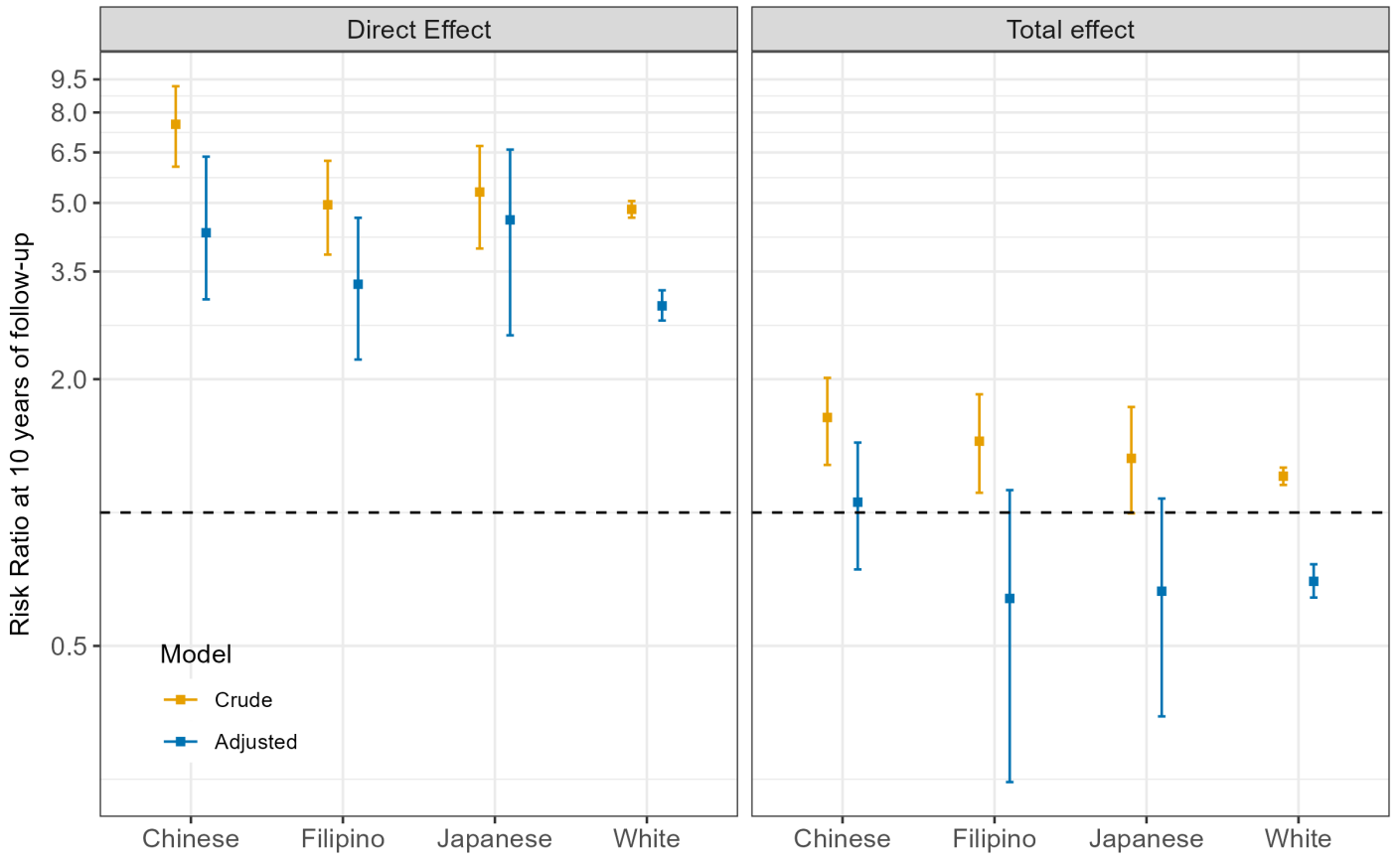
Total effect: Plug IPTW in an Aalen-Johannsen estimator.

Effect estimation: Calculate cumulative incidence of dementia and risk ratio at 10 years of follow-up. Bootstrap confidence intervals.

Results


Chinese (n = 6034)
Filipino (n = 4649)
Japanese (n = 3099)
White (n = 133208)
4
6
8
10
12
14
16
Cause-specific cumulative incidence of stroke (%)
Combined
Ischemic
Hemorrhagic

Effect of stroke on the risk of dementia on the relative scale



Discussion

- The incidence of stroke is high across all Asian American ethnicities and in the White population.

Discussion

- The incidence of stroke is high across all Asian American ethnicities and in the White population.
- Ischemic stroke was more frequently observed, compared to hemorrhagic stroke.

Discussion

- The incidence of stroke is high across all Asian American ethnicities and in the White population.
- Ischemic stroke was more frequently observed, compared to hemorrhagic stroke.
- There is a large effect of stroke on the risk of dementia if we remove the effect that stroke has on death (*as if we could have prevented it*) and this is consistent across groups.

Acknowledgments

This work was supported by NIA R01AG063969, "Alzheimer's disease and related dementias in a diverse cohort of Asian Americans".

Thank you, Gracias!

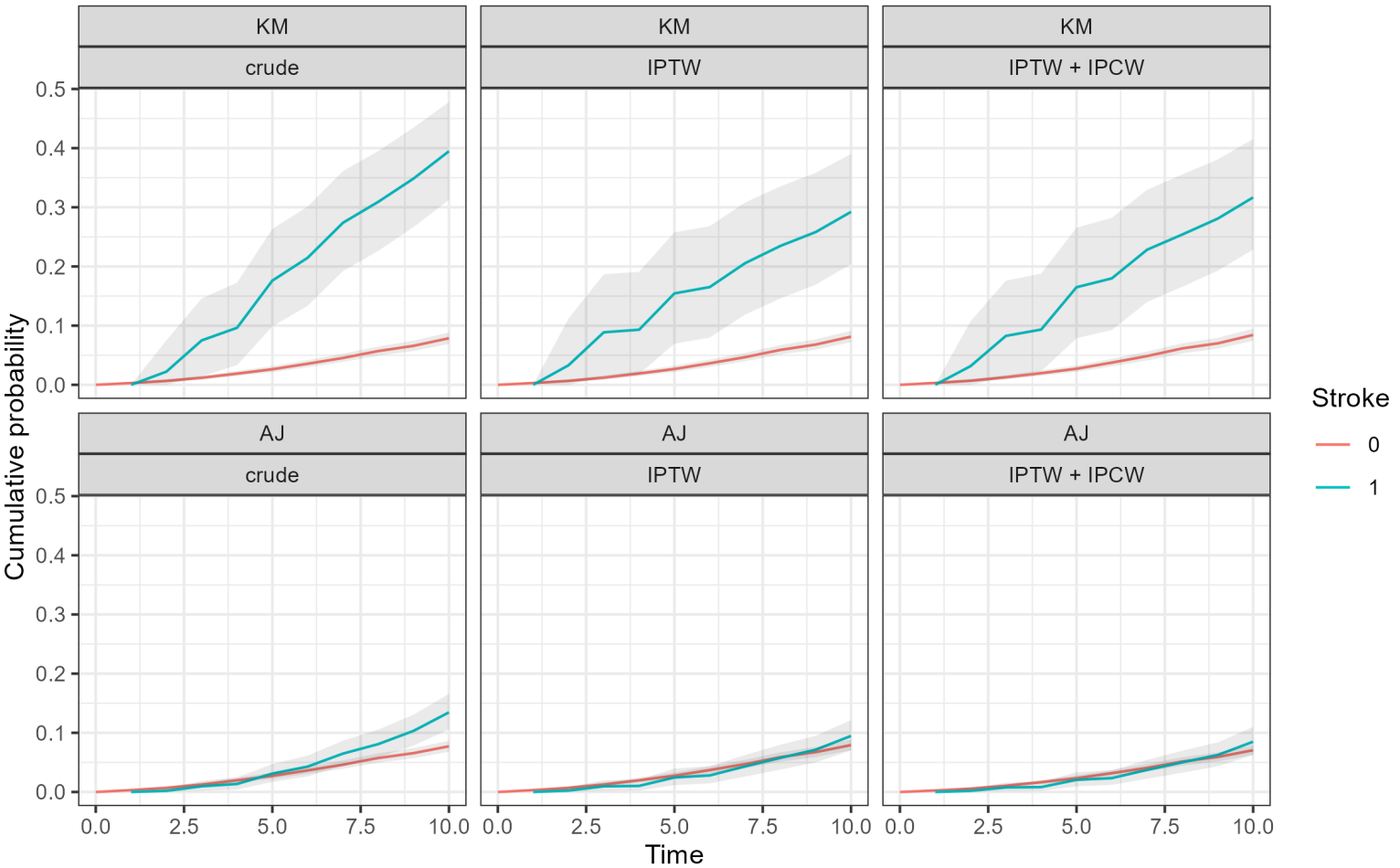
lp.rojassaunero@ucla.edu

@palolili23

@palolili23

Extra slides

Example


KM
crude
KM
IPTW
KM
IPTW + IPCW
AJ
crude
AJ
IPTW
AJ
IPTW + IPCW
Cumulative probability
0.0
0.1
0.2
0.3
0.4
0.5
0.0
2.5
5.0
7.5
10.0
Time
Stroke
0
1

Weights assessment - IPTW for Chinese population