Frailty and All-Cause Mortality among People with HIV Engaged in Clinical Care in the United States

878

Stephanie A Ruderman[1], Carolyn A Fahey[1], Ryan Kyle[1], Edward Cachay[2], Joseph A Delaney[1], Sonia Napravnik[3], Allison R Webel[1], Kenneth H Mayer[4], George A Yendewa[5], Lydia N Drumright[1], Laura Bamford[2], Charles Kamen[6], Michael S Saag[7], Mari M Kitahata[1], Heidi M Crane[1]

[1]University of Washington, Seattle, WA [2]University of California San Diego, San Diego, CA [3]University of North Carolina at Chapel Hill, Chapel Hill, NC [4]Harvard Medical School, Fenway Institute, Boston, MA [5]Case Western Reserve University, Cleveland, OH [6]University of Rochester, Rochester, NY [7]University of Alabama at Birmingham, Birmingham, AL

BACKGROUND

- Frailty is a measure of vulnerability to health stressors and a risk factor for poor outcomes
- People with HIV (PWH) experience frailty at higher rates and younger ages than the general population
- The association between frailty and mortality among PWH has not been comprehensively assessed

➢ **We evaluated the association between frailty and all-cause mortality in a large cohort of PWH and among strata by age and sex**

METHODS

- *Setting*: Centers for AIDS Research Network of Integrated Clinical Systems (CNICS) Cohort
  - CNICS is a 10-site cohort of adult PWH engaged in care at academic clinics across the United States
- *Observation Period*: 01/2015-03/2024
- *Participants*: PWH with ≥1 frailty measure in timeframe

Exposure: *Frailty* was captured using a validated frailty phenotype of four self-reported components (scored 0-4)
- Frailty status: robust (0), prefrail (1-2), frail (≥3)

Outcome: *Mortality* was collected using local, state, and national death indices

- *Covariates* included demographic factors, time-updated HIV factors, clinical comorbidities, and substance use
- *Analysis*: Cox proportional hazards models
  - Stratified by age (<50 vs. ≥50) and sex (male vs. female)

N=7,539

- Median age: 52 (IQR: 41-59)
- 84% male; 16% female
- 45% robust, 44% prefrail, 11% frail

Overall mortality rate: 9.7 deaths per 1,000 person-years

➢ Among frail PWH: 22 deaths per 1,000 person-years

Frailty was associated with a 2.7-times greater risk of **all-cause mortality**

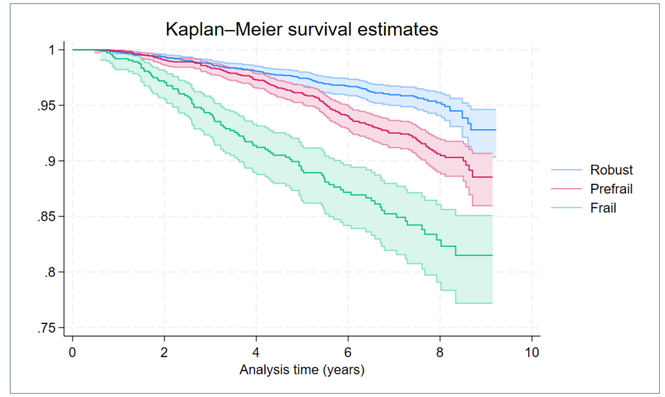
Associations persisted among PWH of all ages, men, and women

RESULTS

Table 1. Hazard Ratio (HR) for the association between time-updated frailty status and mortality among people with HIV in adjusted Cox proportional hazards models, stratified by age (<50 vs. ≥50) and sex

Strata	Frailty Status	HR (95% CI)	p-value
Everyone	Robust	Ref	
N=6752	Prefrail	**1.54** (1.20-1.97)	<0.01
Deaths=360	Frail	**2.69** (2.01-3.61)	<0.001
Age <50	Robust	Ref	
N=3120	Prefrail	**1.62** (1.06-2.48)	0.03
Deaths=119	Frail	**3.62** (2.15-6.10)	<0.001
Age ≥50	Robust	Ref	
N=3632	Prefrail	**1.46** (1.07-2.00)	0.02
Deaths=241	Frail	**2.45** (1.72-3.49)	<0.001
Male	Robust	Ref	
N=5721	Prefrail	**1.46** (1.12-1.91)	0.01
Deaths=302	Frail	**2.61** (1.90-3.59)	<0.001
Female	Robust	Ref	
N=1031	Prefrail	**2.35** (1.10-5.03)	0.03
Deaths=58	Frail	**3.89** (1.70-8.93)	<0.01

RESULTS



LIMITATIONS

- Unable to stratify by age and sex simultaneously
- Frailty phenotype does not include objective measures of muscle strength, though it has been validated

CONCLUSIONS

- Frailty may confer a 2.7-times elevated risk of mortality among PWH
- Risk estimates were consistently elevated among PWH of all ages and men and women
  - Potentially elevated risk among younger PWH and women
- Prioritization of frailty identification and intervention is crucial as HIV care evolves and PWH continue to age

ADDITIONAL INFORMATION

The authors would like to acknowledge all CNICS participants and personnel for their contributions to this work

Contact: Stephanie Ruderman, ruderman@uw.edu

This work was supported by the National Heart, Lung, and Blood Institute at the National Institutes of Health grant R01HL126538 and R56HL160457, National Institute on Aging at the National Institutes of Health grant R33AG067069, and National Institute of Allergy and Infectious Diseases at the National Institutes of Health (K24AI145806, R24AI067039, P30AI027757, P30AI094189, P30AI027767, and T32AI007044)