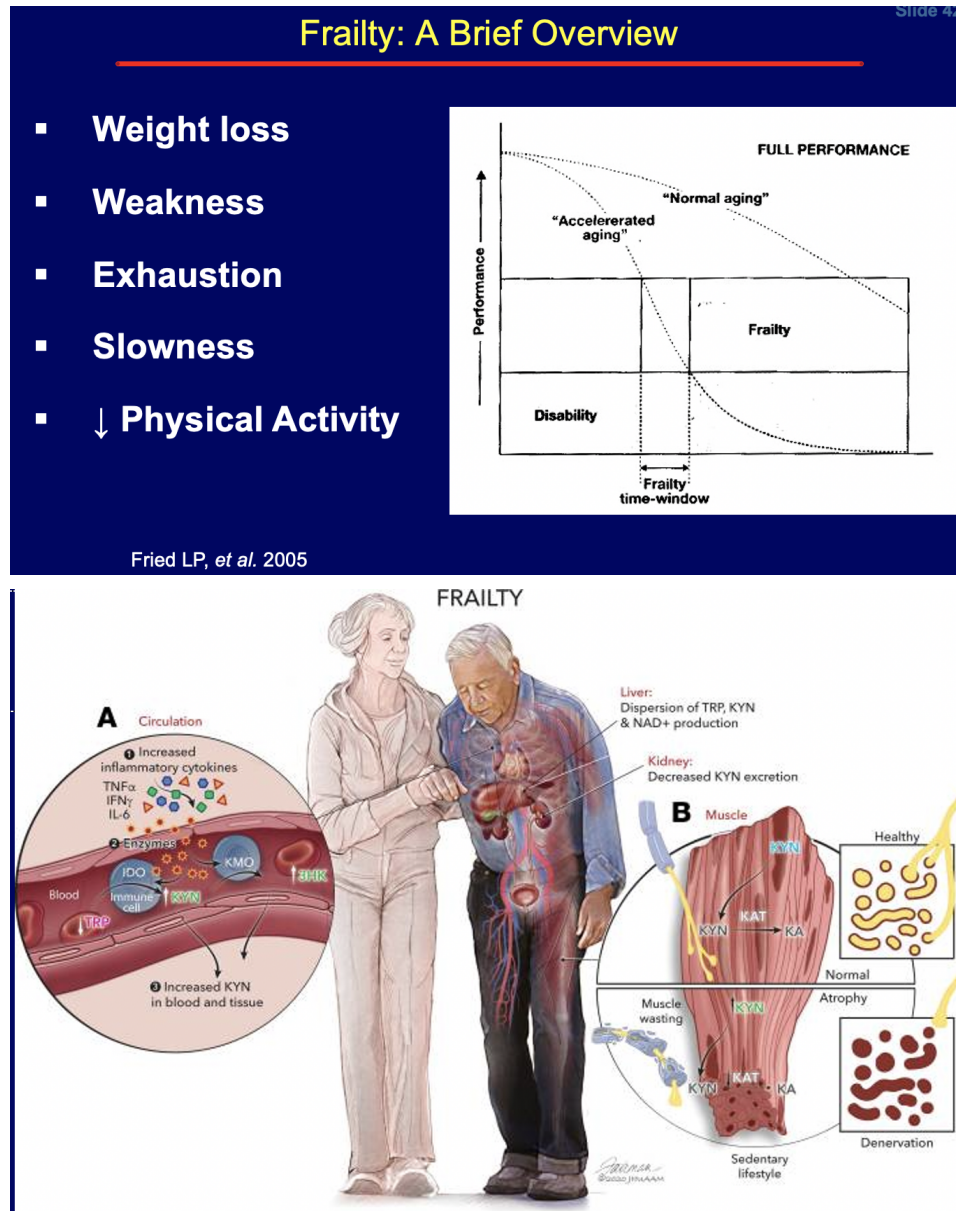


Risk factors for Frailty in PLWH

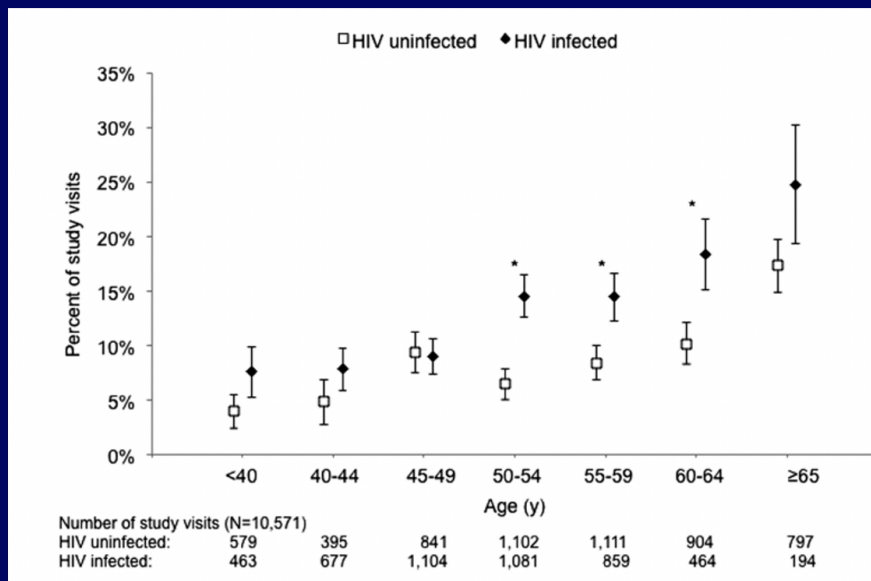
I would add low nadir CD4, history of IDU-heroin or cocaine use, muscle wasting (sarcopenia) as possible contributors. Jules

slides from NATAP webinar talk on Frailty by Kristine Erlandson.



In MACS Cohort HIV+ MSM >65 had 25% frailty vs 15% for HIV-negative.

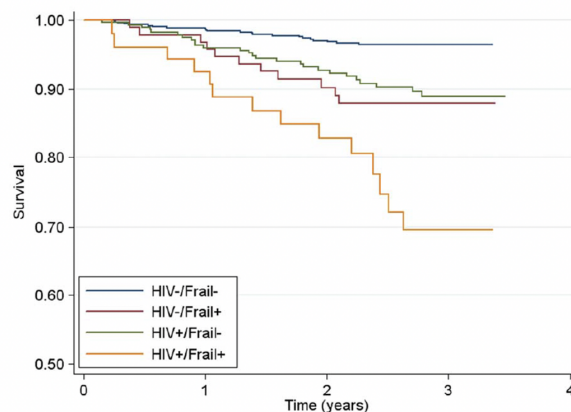
HIV+ Men Are More Frail At a Younger Age vs HIV- Men: MACS



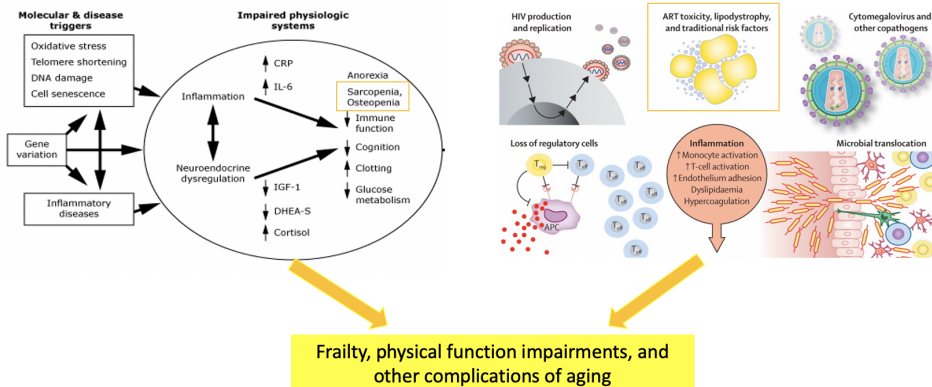
Althoff, J of Gerontology, 2013

Westbrook, JCI, 2022

Frailty is Associated with Lower Survival, Especially in PWH (ALIVE Cohort)



What Factors Contribute to Frailty/Physical Function Impairment in HIV?



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Deeks Lancet 2013

Does Lipodystrophy (or similar fat changes) Contribute to Frailty

- Higher waist-to-hip ratio (marker of lipoatrophy of hip muscles, lipodystrophy abdomen) was associated with frailty
- Higher body mass index, greater fat mass, and trunk fat with lipodystrophy associated with frailty among older women with HIV
- Higher waist circumference associated frailty among older men with HIV

Kooij, AIDS 2016; Shah JAGS 2012; Hawkins AIDS 2018

Do These Factors Contribute to Frailty in HIV?

- HAILO Cohort, n ~ 1000, age 45 and older, >90% undetectable VL
- **Frailty:**
 - Age
 - Education
 - Insurance
 - Obesity
 - Lower **physical activity**
 - Initial randomized NNRTI
 - Smoking
 - Neurocognitive impairment

Modifiable risk factors:
Smoking, weight, and physical activity

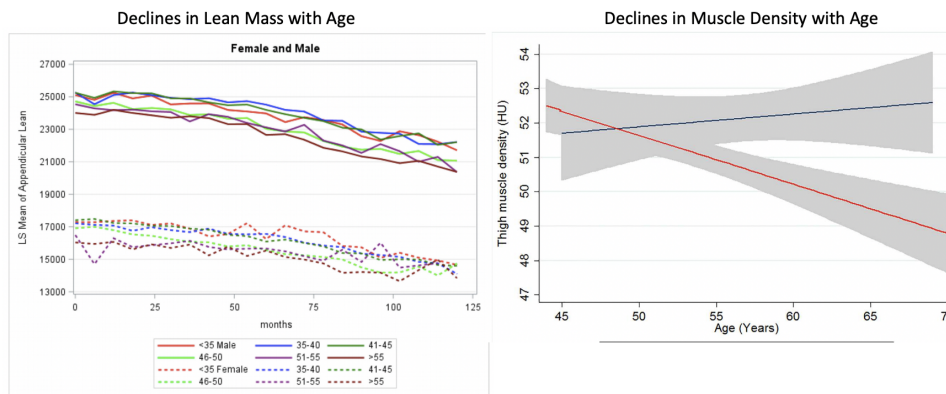
ART may play a role

NOT comorbidity driven

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Excellent review in Brothers, TD, et al JID 2014
Erlandson JID 2017

Muscle Changes in HIV with Aging



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Antivir Ther 2019; PLoS One 2017

What do we know about ART on skeletal muscle mass & function?

- ART initiation typically associated with lean body mass gain (estimate of muscle mass) “return to health”
- Follow-up scans 7 years later found that after the initial ~ 3 years, lean body mass declined with ART (A5318)
- Re-read CT scans for area and density of the trunk (back/abdominal muscles)
 - The total muscle area increased, but not the ‘lean’ part of the muscle
 - Significant decreases in muscle density (ie, ↑↑ fat)
 - Gains in lean mass with initial ART may represent an increase in lower quality, fat-infiltrated muscle with ART

McComsey Clin Infect Dis 2016; Grant, et al. under review; Yareskeski, J Gerontol Biol Sci 2011

What Happens to Muscle with Age?

- Decline in muscle quantity (mass) and quality (function) begins ~ age 30-40
- Decline in *function* (such as strength) happens before a *muscle mass* decline
- Loss of both function and mass = sarcopenia, which is a strong predictor of increased morbidity and mortality
- Aging is also associated with increased fat within the muscle

Frailty or Physical Function Impairment may Predict Falls in Middle-Aged/Older Adults with or at Risk for HIV

Recurrent falls in ~ 30-40%

Falls associated with

- Difficulty with balance
- Exhaustion (from frailty)
- Weight loss (from frailty)
- Diabetes
- Medications:
 - Antidepressants
 - Opioids
 - Didanosine
 - Sleeping pills

Falls in MACS Associated with:

- Time to stand
- Pre-frailty (but not frailty)
- Confidence with balance

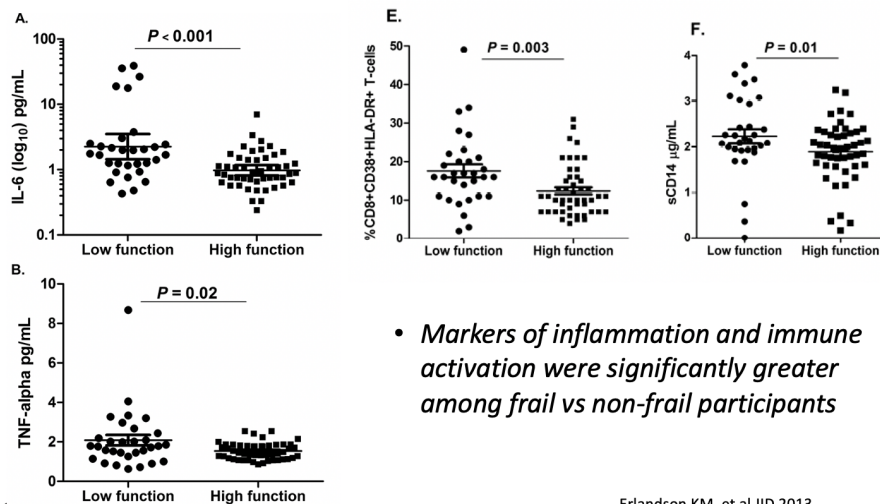
Falls in WIHS Associated with:

- Frailty
- Exhaustion (from frailty)
- Weight loss

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Erlandson JAIDS 2012; Erlandson JAIDS 2019; Sharma Antivir Ther 2019

Inflammation and Immune Activation



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Erlandson KM, et al JID 2013