

Changes in Body Mass Index Over Time in Persons With and Without HIV

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Disclosures

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Weight and Body Composition Changes Have Always Posed Clinical Challenges for Persons with HIV (PWH)

- HIV wasting syndrome / cachexia was an early hallmark of HIV progression
- Older antiretroviral therapy (ART) associated with adverse metabolic effects
- Weight gain following successful ART treatment is common (i.e., “return to health”)
- Recent data¹ suggest integrase strand transfer inhibitors (INSTIs) may be associated with a faster increase in weight
- *To evaluate whether weight gain in PWH is due to return to health, adverse ART effects, or both, it is useful to compare with uninfected populations, although limited data exist.²*

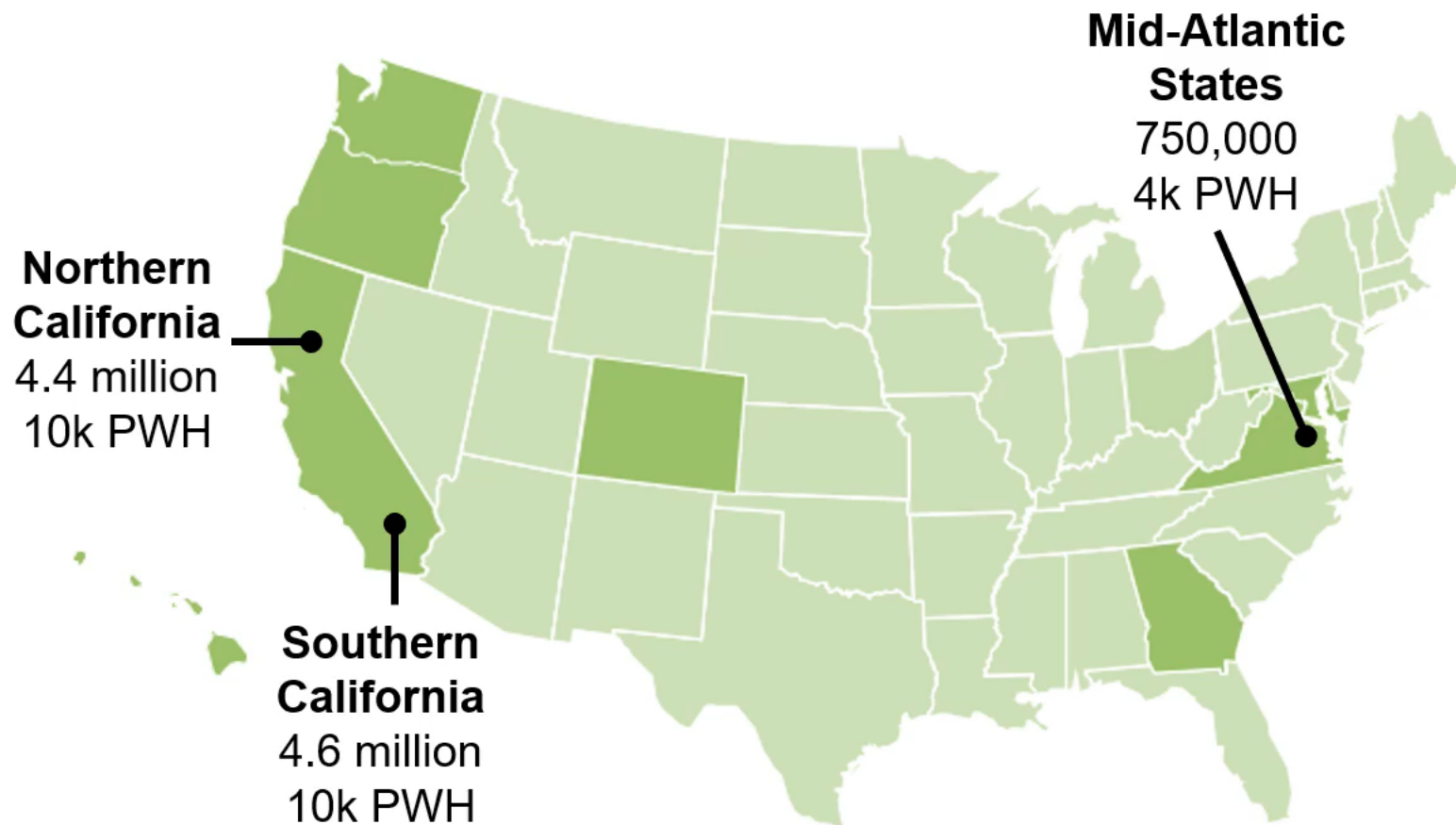
¹ Bourgi K, et al. JIAS 2020

² Brown T et al. AIDS 2007

Study Objective

To compare changes in body mass index (BMI) between PWH initiating ART and uninfected persons identified from the same healthcare system

Study Setting: Kaiser Permanente



- Integrated healthcare systems
- Founded in 1945
- 8 states and DC
- Electronic health record
- 12.4 million members
- ~30,000 PWH

Methods

- Study design: cohort study
- Source population:
 - PWH: adults (≥ 21 years); KP member 2000-2016
 - Uninfected: frequency-matched 1:10 by age, sex, race/ethnicity, clinic, year
- Study population:
 - Follow-up restricted to 2006-2016
 - Excluded if no baseline body mass index
 - Excluded PWH if ART started before 2006
- Data sources: Electronic health record and HIV Registries

Statistical analysis

- Outcome: Recorded BMI (kg/m²) from baseline to 12 years
- Exposure: HIV status and time (in years)
- Linear mixed effects models measuring changes over time in BMI by:
 - a. HIV status
 - b. HIV status and baseline BMI:
 - normal/underweight (<25.0 kg/m²)
 - overweight (25-29.9 kg/m²)
 - obese (≥30 kg/m²)
- Potential confounders included in models were age, race/ethnicity, sex, year, substance use disorders, smoking, census-based education/income, insurance type, and common comorbidities

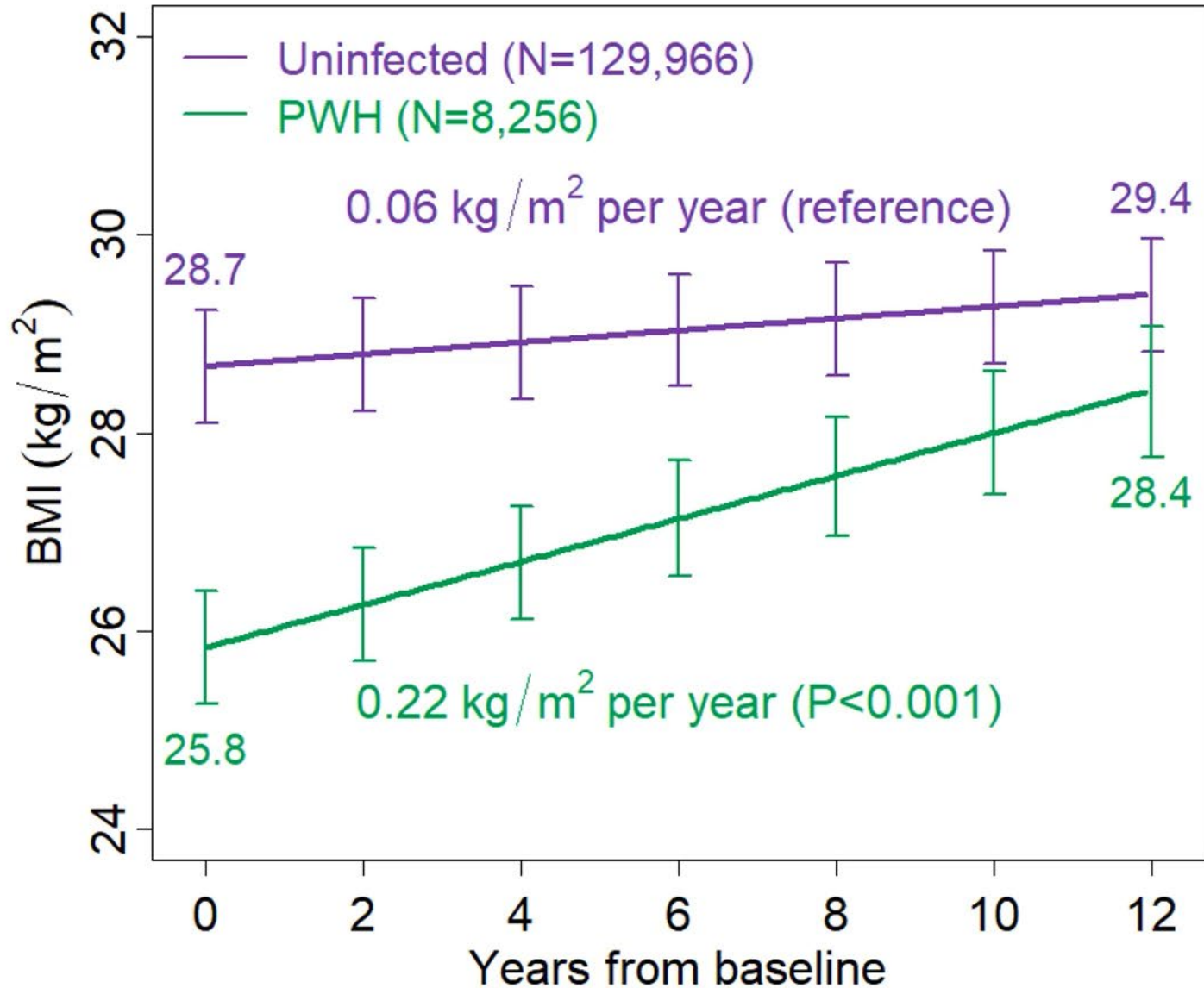
Baseline characteristics

	PWH	Uninfected
N	8,256	129,966
Mean age, years	41	42
Male, %	88	87
Race/ethnicity, % among known		
White	36	40
Black	26	26
Latinx	26	24
Asian/Pacific Islander	6	5
Alcohol use disorder	11	7
Substance use disorder	16	6
Ever smoking	47	37
HIV exposure, % among known		
Men who have sex with men	68	Not applicable
Heterosexual sex	24	
Injection drug use	7	
Other	1	

BMI measurements

	PWH	Uninfected
N	8,256	129,966
Baseline BMI, %		
Underweight (<18.5 kg/m ²)	3	1
Normal (18.5-24.9 kg/m ²)	44	24
Overweight (25.0-29.9 kg/m ²)	35	38
Obese (≥30.0 kg/m ²)	18	37
Median # BMI measures (IQR)	8 (4-17)	5 (2-9)

Change in BMI by HIV status



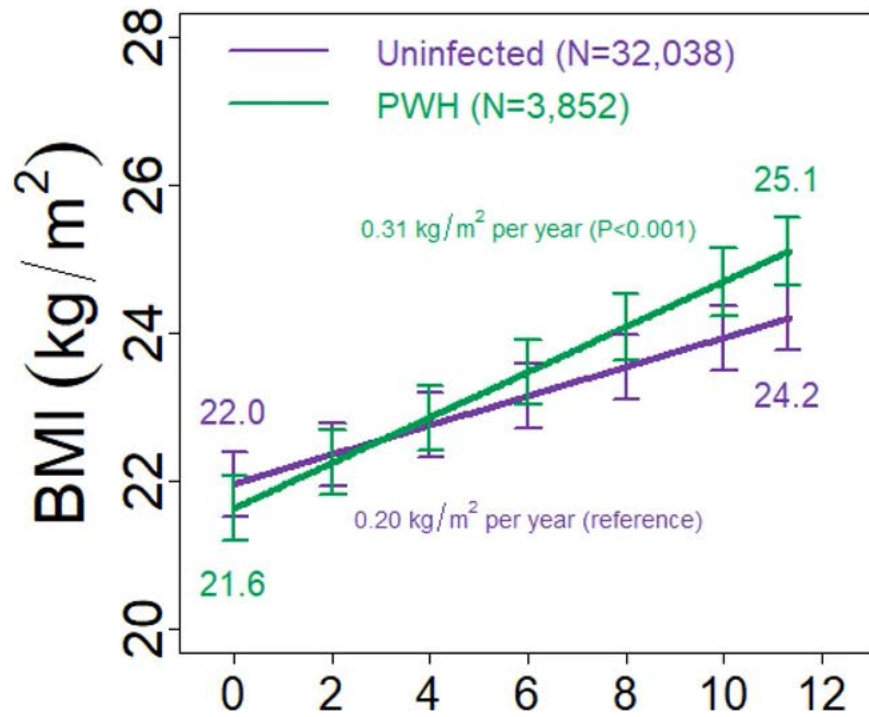
PWH had lower BMI at the start but increased at 3-times the rate of uninfected.

By 12 years PWH and uninfected had similar BMIs

Change in BMI by HIV status and baseline BMI

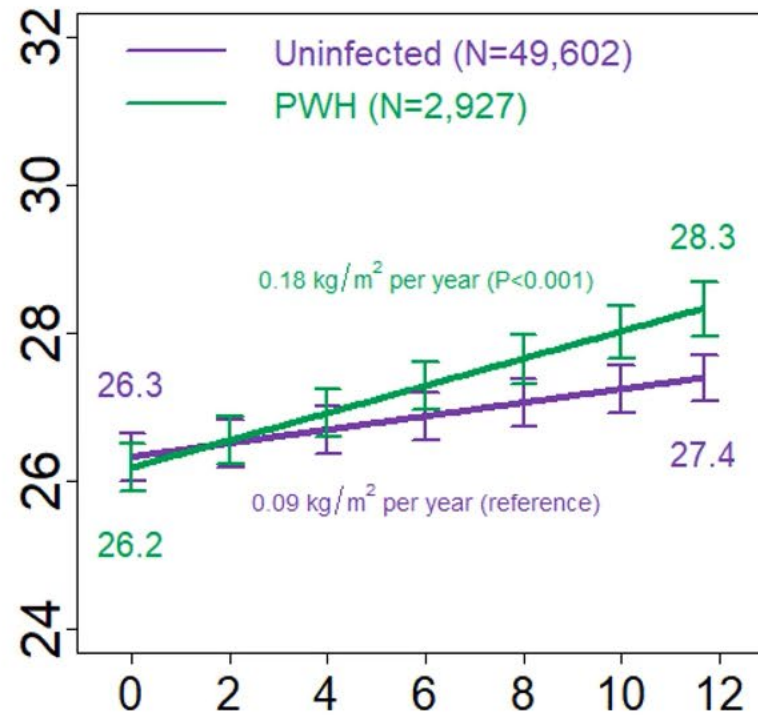
Normal/underweight

(<25.0 kg/m²)



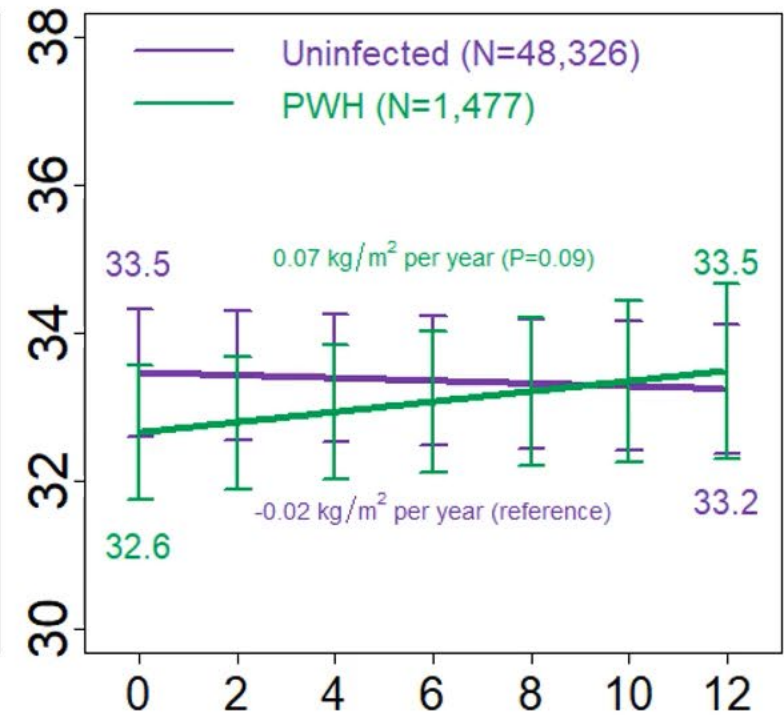
Overweight

(25.0-29.9 kg/m²)



Obese

(≥30 kg/m²)



Years from baseline

Comparing PWH and uninfected people with similar BMI at the start, PWH had faster increases and ended up with a higher BMI at 12 years

Summary

- By 12 years follow-up, BMI was similar by HIV status reaching an average 28.4 kg/m² for PWH and 29.4 kg/m² for uninfected adults, both at the upper range of overweight
- BMI increased more than 3 times as fast for PWH (0.22 kg/m² per year) compared with uninfected adults (0.06 kg/m² per year)
- Stratifying by baseline BMI, PWH had faster BMI increases compared with uninfected adults, with higher BMI at 12 years for all categories

Strengths and Limitations

Strengths

- Large cohort with well-matched uninfected comparison group
- High-quality ascertainment of HIV status
- Generalizable to the broader insured population

Limitations

- BMI is imperfect measure (e.g., doesn't account for muscle mass)
- Misclassification of clinically-derived study measures
- Unmeasured confounding (e.g., diet and exercise)
- Limited generalizability to women

Conclusions

- BMI is increasing more rapidly over time for PWH, and may soon exceed levels of demographically-similar uninfected adults in U.S.
- Given the known higher risks of BMI-related comorbidities in PWH, such as cardiovascular disease, it is critical that future research clarify the role of HIV-specific risk factors for weight gain, including INSTIs and other antiretrovirals, and to identify appropriate interventions.

**Thank
you!**

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