Abdominal adipose tissue depots and cancer risk in the WHI: A foundation for novel insights into the obesity-cancer relationship

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Outline

- Background: Obligatory obesity overview
- WHI DXA cohort and abdominal adipose tissue depots
- Preliminary data
- A foundation for novel insights into the obesity-cancer relationship
- Bonus(*as time allows) – Further scientific leverage of this data*

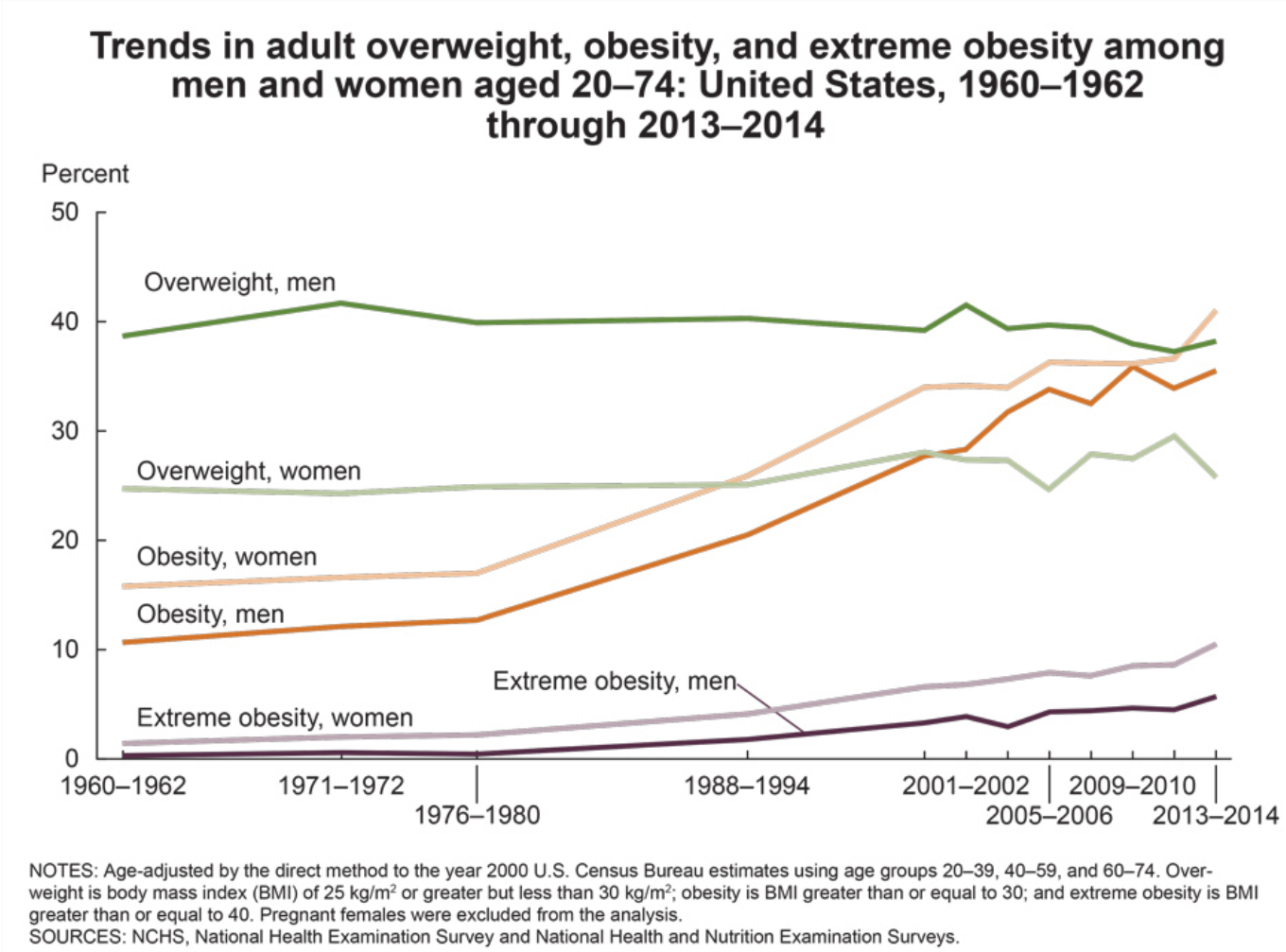
An exercise in measurement: Defining Obesity

- BMI (Body Mass Index, kg/m^2)
- Is BMI a good measure of overweight and obesity? Flaws?
- WHO defines overweight and obesity as abnormal or excessive fat accumulation that may impair health (% body fat- physiological)
- Which of these two general measures should we base definitions on? Risk assessments? Or should we be using an even further granular measure (e.g. visceral adipose tissue?)

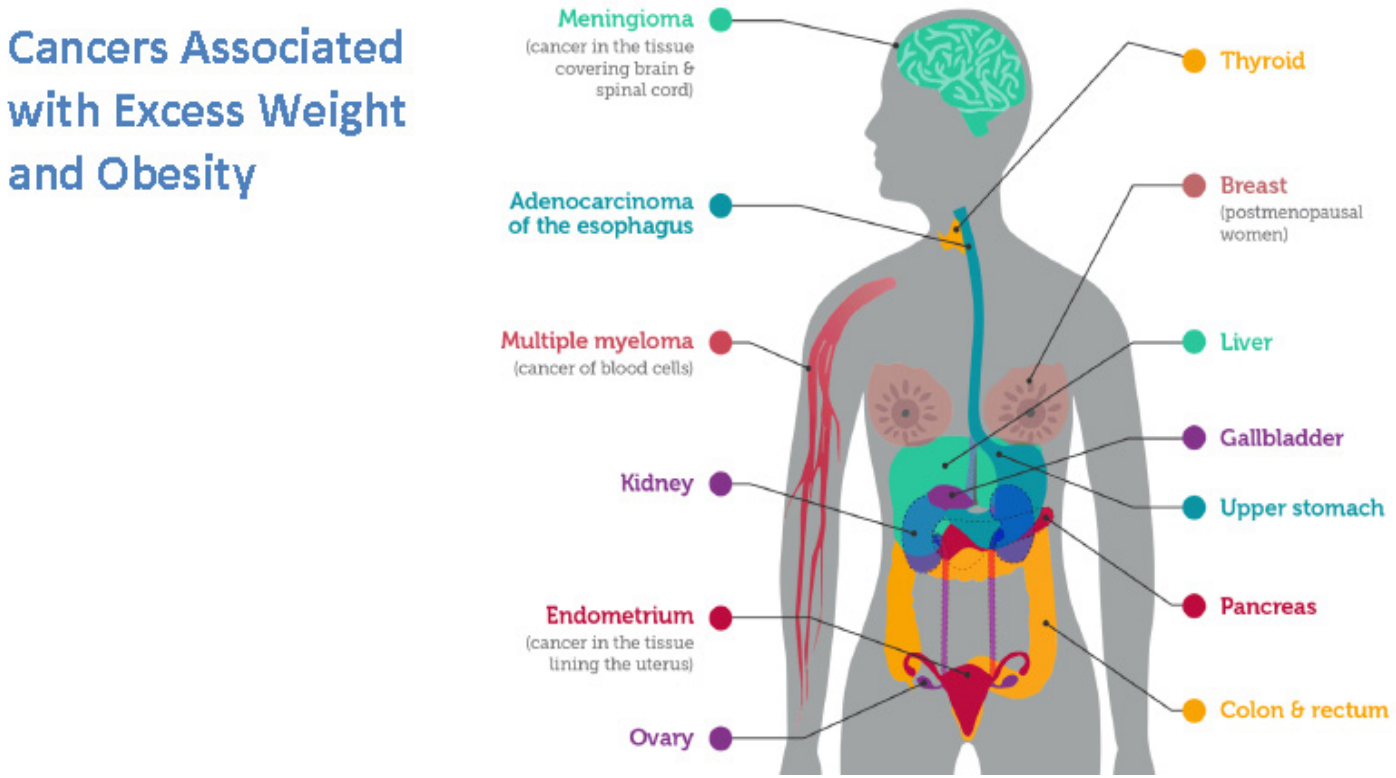
Obesity

- Complex chronic disease
- Myriad causes
- Heterogeneous
- Harms nearly every organ system
- Understood?

The weight of the nation: 70% overweight and obese



Obesity: An increasing burden on cancer



Source: cancer.gov/obesity-fact-sheet

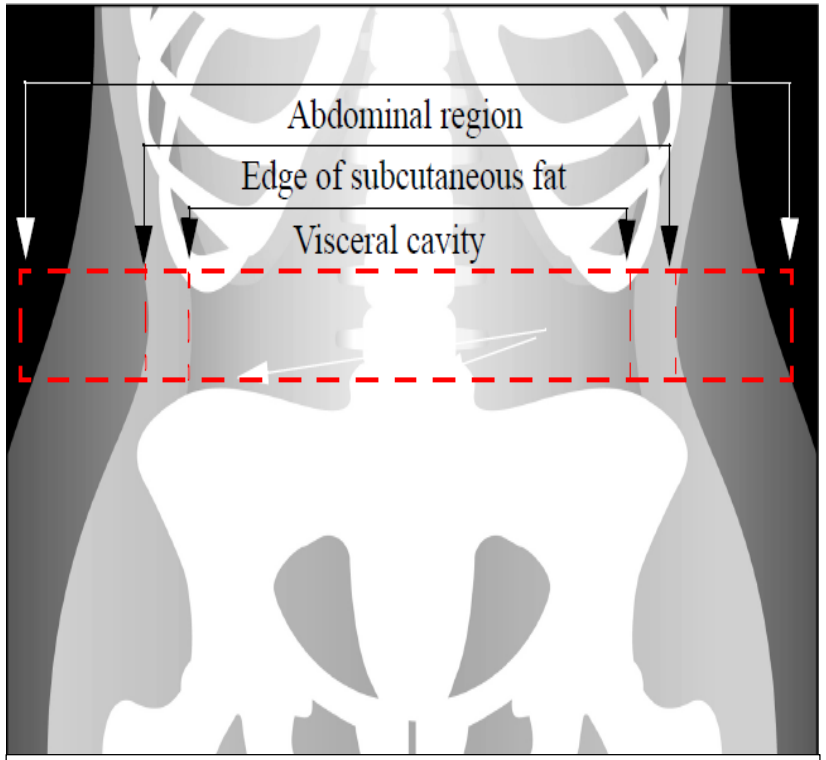
WHI DXA cohort

- WHI DXA Sites
  - Pittsburgh, PA (N= 3,590)
  - Birmingham, AL (N=3,665)
  - Tucson-Phoenix, AZ (N=3,765)
- Age Groups (years)
  - 50-59 N=3,795 (34%)
  - 60-69 N=4,727 (43%)
  - 70-79 N=2,498 (23%)
- Split between Observational (OS) and Clinical Trials (CT)
  - Total N=11,020
  - OS N=6,365 (58%)
  - CT N=4,655 (42%)
- Enriched for diverse ethnic/racial backgrounds

Abdominal Adipose Tissue Depots

- Derivation

Historical DXA scan ROI placement for Hologic software VAT and SAT analysis.



Soft tissue depiction of Hologic software ROI selection and lines of demarcation used for VAT and SAT calculations

Abdominal Adipose Tissue Depots: Validation

Partial correlations for DXA-derived fat by Hologic QDR 2000 and 4500 DXA machines and corresponding MRI fat (height & age adjusted, N=104)		
MRI-fat compartment	**QDR2000**	**QDR4500**
Visceral fat	0.85	0.83
Subcutaneous fat	0.82	0.83
Total fat	0.85	0.86
*Mean (SD) VAT:129.15(61.84cm^2); SAT:349.89(119.39cm^2)		

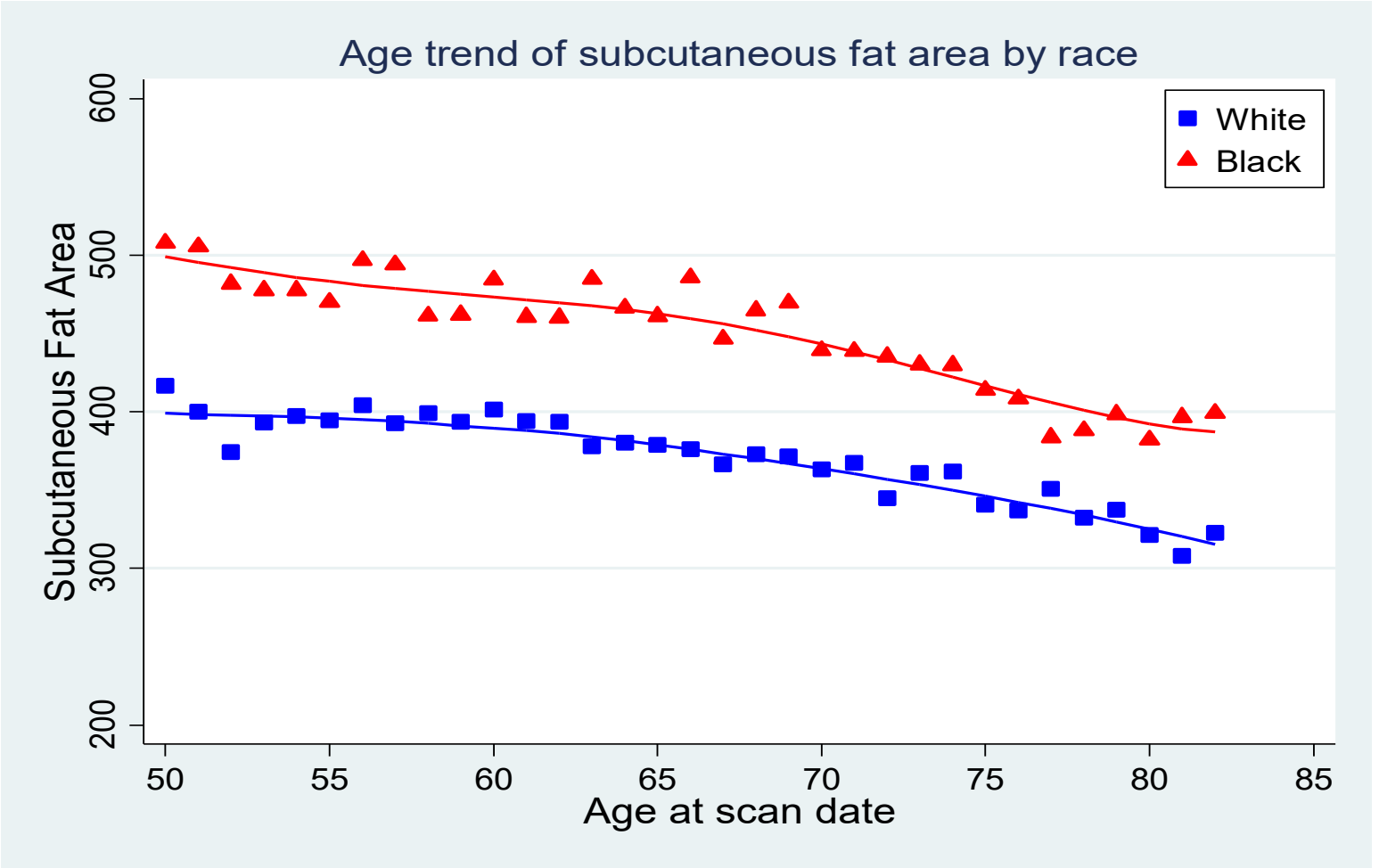
Aims of Cardiometabolic grant

- Descriptive visceral/subcutaneous patterns

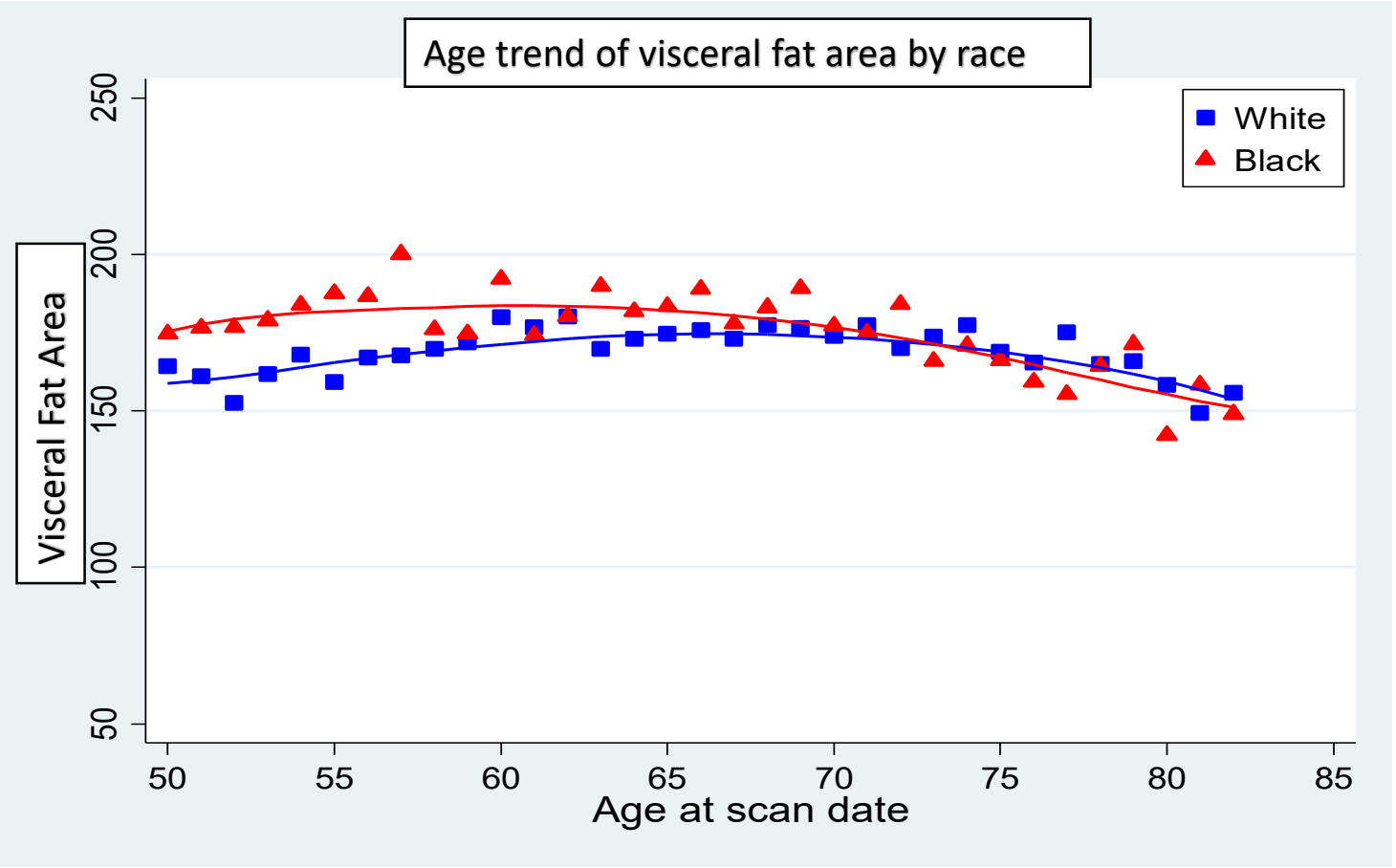
- Examine hypothesized predictors of the VAT/SAT dynamics in dietary intake, physical activity, sleep patterns, smoking, alcohol
- Examine effect of WHI low fat dietary intervention on dynamics

- Examine baseline VAT/SAT and dynamics with incidence of cardiometabolic outcomes (T2D, spectrum CVD outcomes)

Preliminary Data



Preliminary Data



Preliminary Data

- Linear Mixed Models to get longitudinal trajectories of visceral (VAT) and subcutaneous adipose tissue (SAT) depots

- **Initial summary**
- Differential VAT patterns by age with threshold ~65 years
- Increase of VAT from 50-65 in white women / Flat in black women
- Decrease of VAT from age 65, with greater slope in black women

- Decrease in SAT in all women over course of scans regardless of age

A foundation for novel insights into the obesity-cancer relationship

- Pending project (Bea, U of AZ, PI)

- This data should be **consequential** for context and understanding of the “obesity-cancer” question

- 3 main aims

A foundation for novel insights into the obesity-cancer relationship

- Aim 1: Examine VAT and SAT baseline levels and dynamics with postmenopausal breast and colorectal cancers + other obesity-related cancers in context of total and regional body composition/anthropometry

- Aim 2: Cancer-specific Mortality

- Aim 3: Can these new measures of AAT improve common risk models? (i.e. BCRAT, CCRAT)

Further novel insights

- Examining the role of AAT and overall body composition in the etiology of other common cancers where “obesity” is not typically considered a risk factor, but where underlying AAT composition and body composition may modify other typical major risk factors (e.g. lung)

- **These data will provide a distinctive opportunity to examine the relationship of VAT and SAT with cancers with potential links related to adiposity but that are understudied,** such as melanoma, bladder, and hematologic cancers

Bonus – Further Scientific Leverage

- Leveraging this data for insight into the role of body composition and abdominal adipose tissue in the etiology of **Dementia and Alzheimer's**

- Interest in connecting with researchers here to discuss the possibility of developing this endpoint in this DXA cohort; and at the least a nested case-control study within the cohort with this new AAT data

Acknowledgements

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- Questions?

- My email: aodegaar@uci.edu