Body Composition & Cancer
WHISC Ancillary Study

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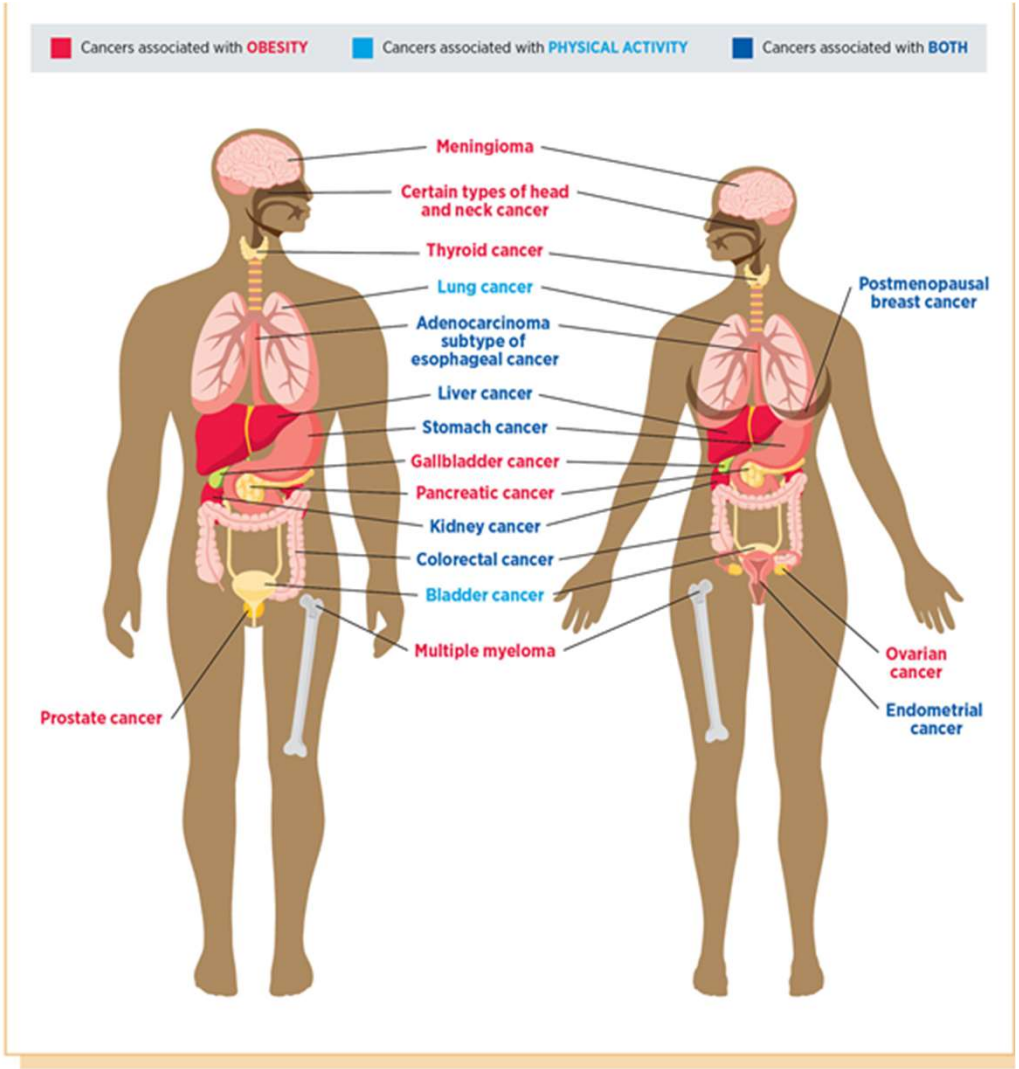


American Association for Cancer Research (AACR) Cancer Disparities Progress Report 2020

- Obesity defined by elevated BMI (>30kgm^2) is associated with increased risk of ≥13 cancers
- Some cancers also associated with inadequate physical activity
- Some with both high BMI and low physical activity

Obesity and Cancer

Béatrice Lauby-Secretan, et al, Body Fatness and Cancer — Viewpoint of the IARC Working Group, N Engl J Med 2016; 375:794-798; https://www.cancer.gov/about-cancer/causes-prevention/risk/obesity/overweight-cancers-infographic

	n	%
First incident cancer—any*	2017	20.27
Breast	788	7.92
Invasive	639	6.42
In situ	149	1.5
Colorectal	191	2.17
Lung	254	2.55
Cause of death	n	%
Deaths from all causes	4611	46.34
Cancer	914	9.19
Breast Cancer	87	0.87
Colorectal	88	0.88
Lung Cancer	230	2.31

*after baseline; total sample n=9950

DXA COHORT Cancer Incidence & Deaths

When we split the >10,000 women into 5 equal groups from low to high fat mass (quintiles)

- 88% increase in risk of postmenopausal breast cancer in the highest total body fat mass group

- 2 times increased risk of postmenopausal breast cancer in the highest trunk fat mass group

Rohan T, 2013

Among women “normal weight” women split into 4 equal groups (quartiles) of fat mass from low to high (N=3,460)

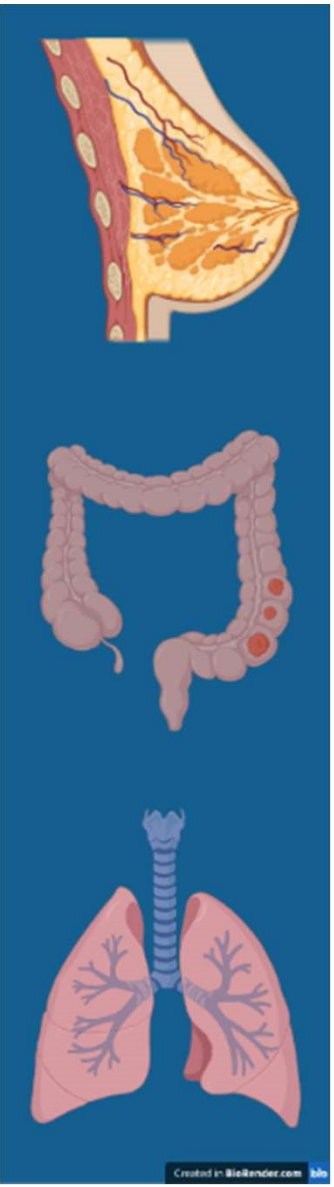
- 89% increased risk of postmenopausal breast cancer in the highest total body fat mass group

- 88% increased risk of postmenopausal breast cancer in the highest trunk fat mass group

Iyengar N, 2018

What about abdominal fat?

What about other cancer types?



Abdominal Fat associations with…

Breast Cancer

Colorectal Cancer

Lung Cancer

Obesity Related Cancers Combined

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Abdominal Adipose Tissue Estimation

- Total body, trunk, arms, legs, and abdominal
- Abdominal broken into Visceral Adipose Tissue, Subcutaneous Adipose Tissue

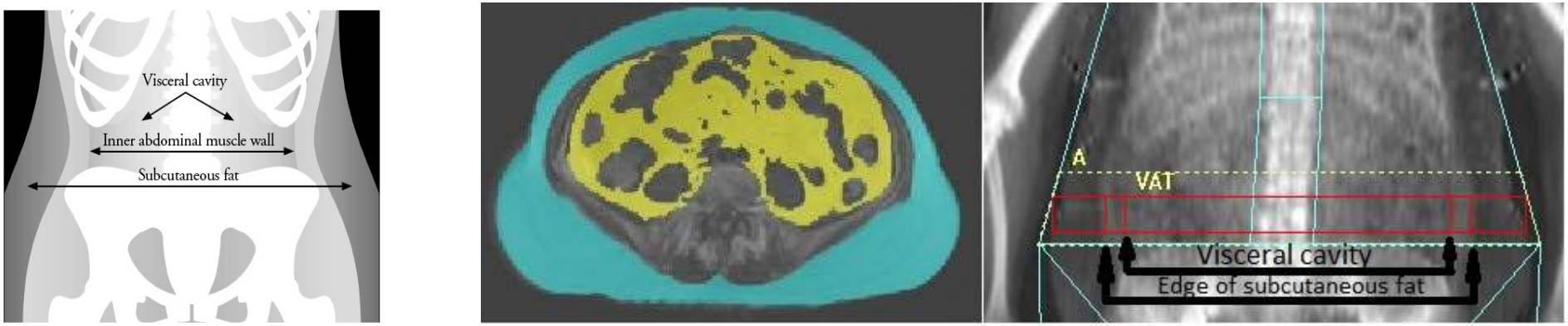


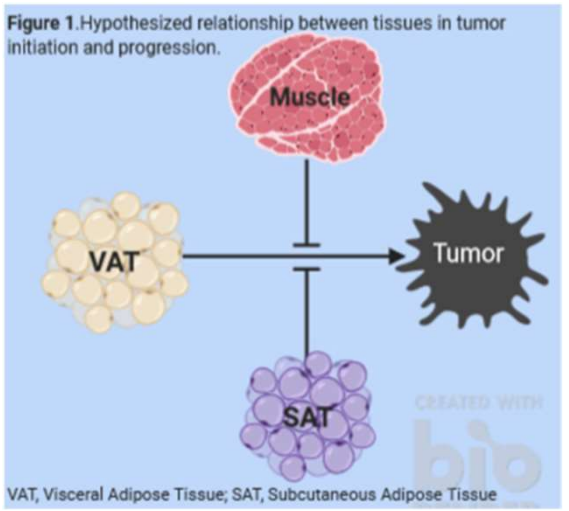
Figure 1. Representative example of abdominal visceral and subcutaneous fat quantification by MRI and DXA techniques.
The MRI image (left) represents an axial slice at the L3-L4 intervertebral space; slice thickness is 10mm. The visceral adipose tissue is colored in yellow and subcutaneous adipose tissue is colored in blue. The two-dimensional DXA (right) regions of interest for lateral subcutaneous adipose and total abdominal adipose are demarcated by the lines drawn at L4. Lateral subcutaneous adipose is used to approximate total subcutaneous adipose. Total subcutaneous adipose is then subtracted from total abdominal fat to derive the visceral adipose tissue estimate. DXA image: A, android subregion VAT, visceral adipose tissue

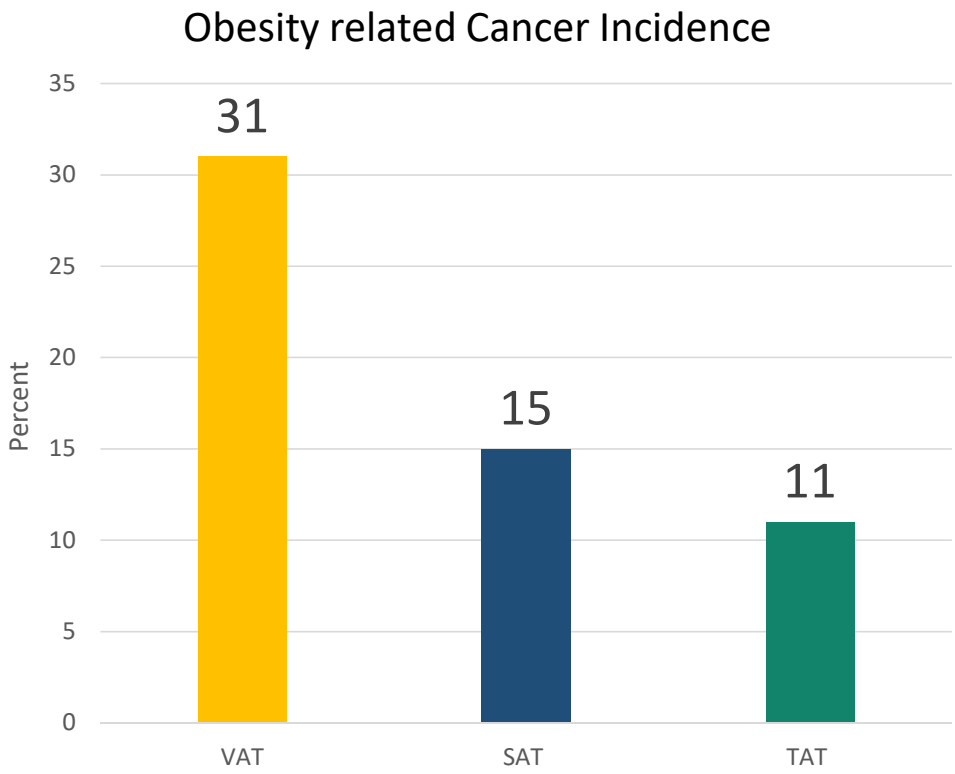
Bea JW, J Clin Densitom; *Under Review*

- Why abdominal fat?
  - Increased fat/Decreased skeletal muscle with aging
  - Re-distribution of fat, including to the abdomen

- Visceral adipose tissue (VAT) differs from subcutaneous adipose tissue (SAT)
  - Glucose regulation
  - Inflammation
  - Immune function

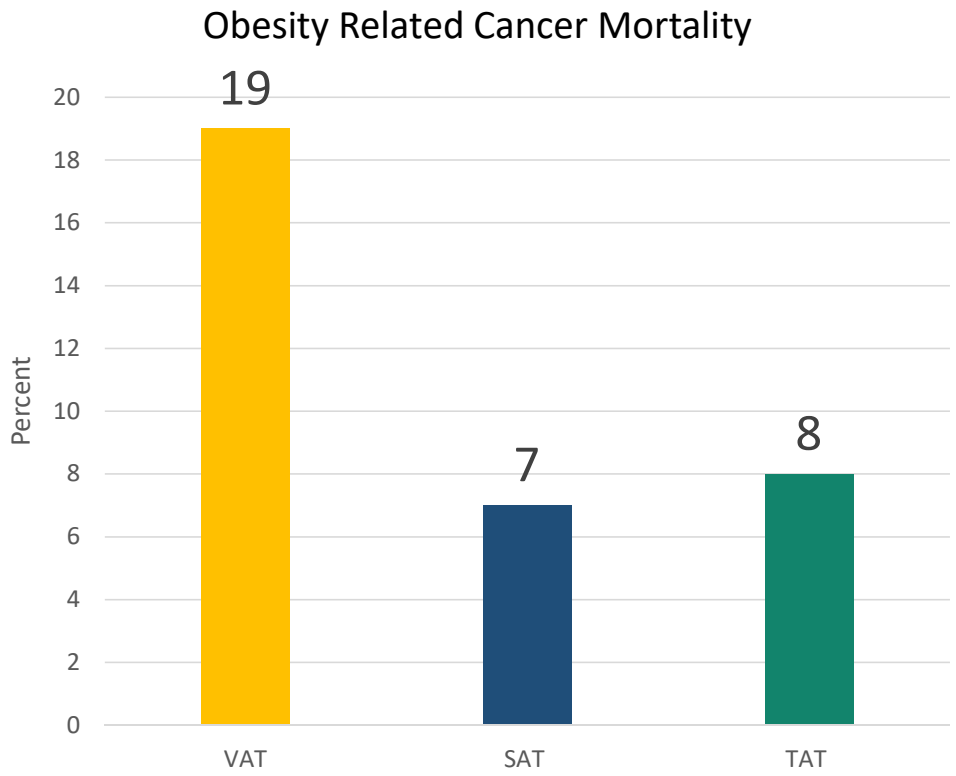
Central hypothesis: higher VAT levels are the driver of cancer risk





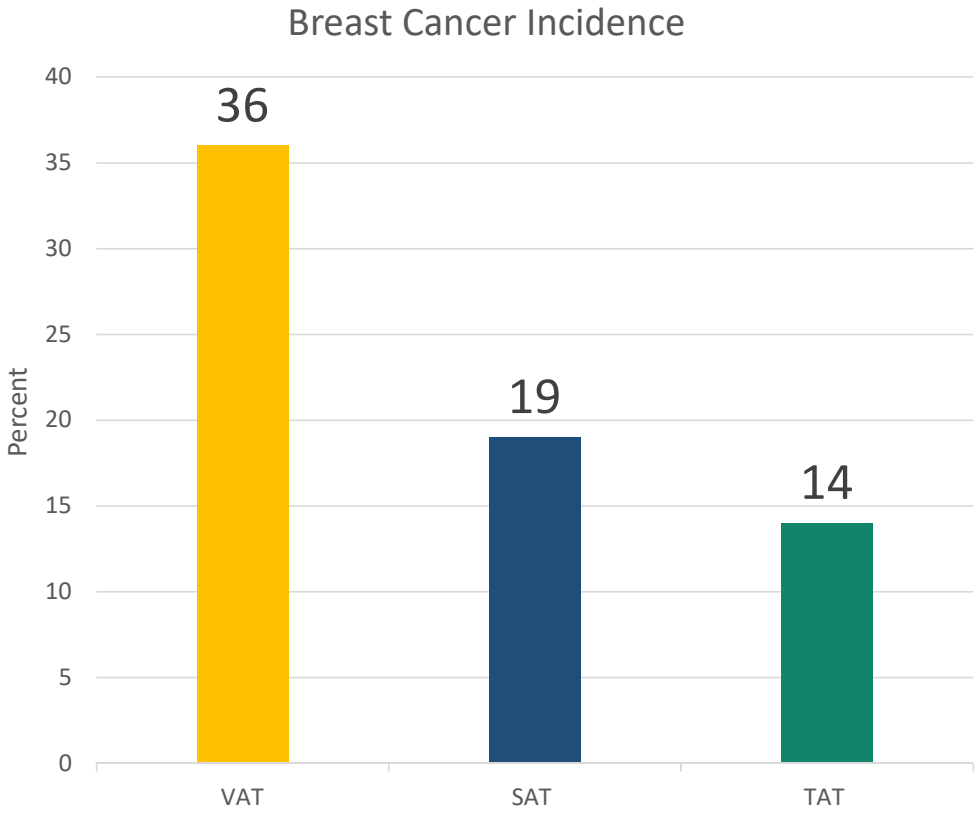
Incidence of Obesity related Cancers combined related to abdominal adipose tissue compartments*

age at baseline, region, education, income, race and ethnicity, hormone therapy trial arm, diet modification trial arm, calcium and vitamin D trial arm, height at baseline, alcohol intake, smoking status, physical activity (MET-hrs/wk), physical function (SF 36 score), total energy intake (kcal/day), HEI-2015 score, hormone therapy, female relative with cancer, oral contraceptive use, age at menarche, age at first birth, total number of months of breastfeeding, age at menopause, surgical menopause



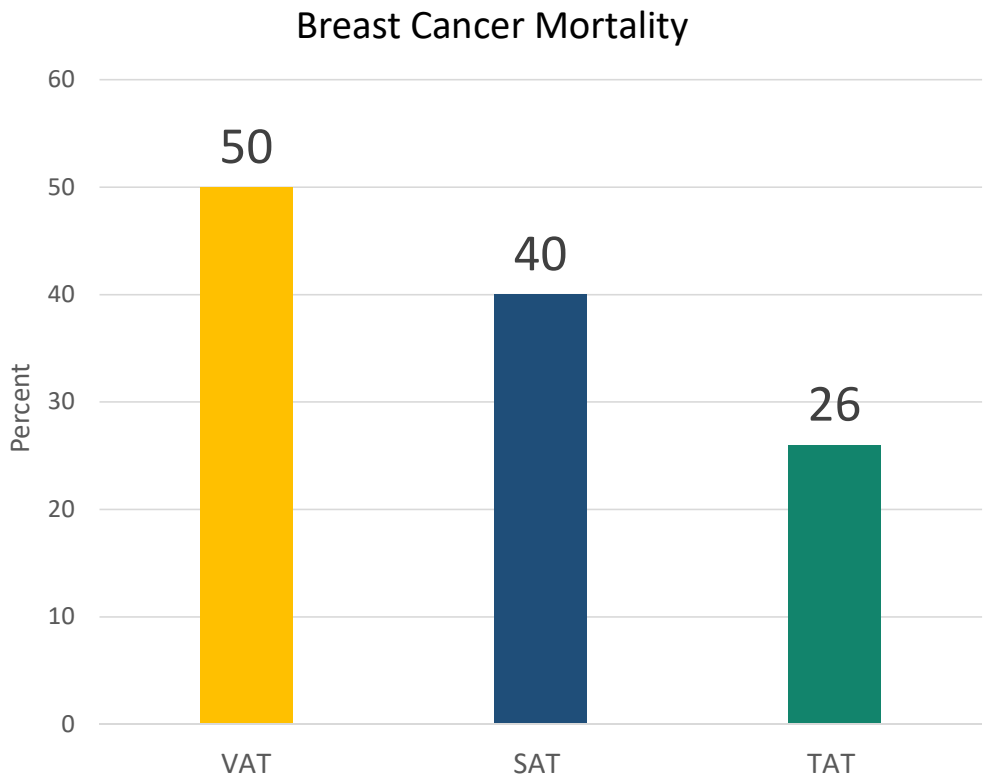
Obesity Related Cancer Mortality

Age at baseline, Region, Education, Income, Race and ethnicity, Hormone Replacement therapy trial arm, Diet Modification trial arm, Calcium and Vitamin D trial arm, height at baseline, alcohol intake, smoking status, Physical activity (MET-hrs/wk), Physical function (SF 36 score), Total energy intake (kcal/day), HEI-2015 score, Hormone replacement therapy, Aspirin, Metformin, relative with any cancer, Age at menarche, Age at first birth, Total number of months of breastfeeding, Age at menopause



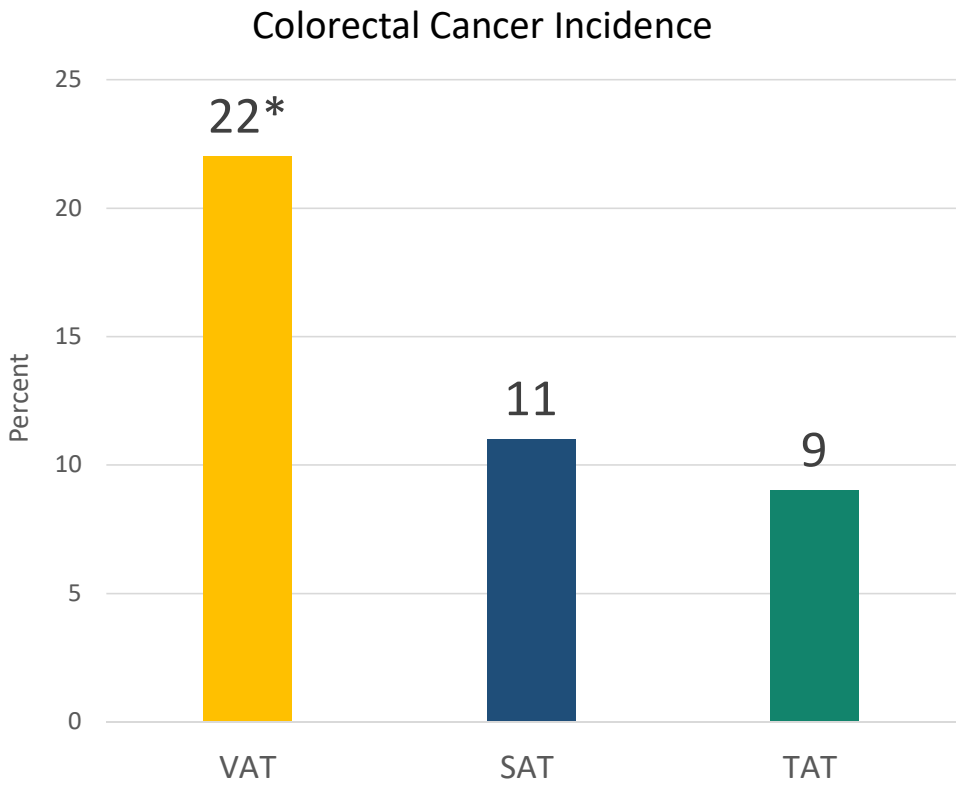
Breast Cancer Incidence*

age at baseline, region, education, income, race and ethnicity, trial arm, height at baseline, alcohol intake, smoking status, physical activity (MET-hrs/wk), physical function (SF 36 score), total energy intake (kcal/day), HEI-2015 score, hormone replacement therapy use at baseline, aspirin use at baseline, metformin use at baseline, female relative with breast cancer, age at first birth, total number of months of breastfeeding, age at menopause)



Breast Cancer Mortality*

age at baseline, region, education, income, race and ethnicity, hormone therapy trial arm, diet modification trial arm, calcium and vitamin d trial arm, height at baseline, alcohol intake, smoking status, physical activity (MET-hrs/wk), Physical function (SF 36 score), total energy intake (kcal/day), HEI-2015 score, hormone therapy, aspirin, metformin, female relative with breast cancer, age at menarche, age at first birth, total number of months of breastfeeding, age at menopause, surgical menopause



Colorectal Cancer Incidence

age at baseline, region, education, income, race and ethnicity, trial arm, height at baseline, alcohol intake, smoking status, physical activity (MET-hrs/wk), physical function (SF 36 score), total energy intake (kcal/day), HEI-2015 score, relative with colorectal cancer

Colorectal Cancer Mortality & Lung Cancer Outcomes

In process

PHYSICAL ACTIVITY

HEALTHY DIET

What can we do?

Physical activity guidelines

TIPS

- You may be able to do more than 150 of moderate or 75 minutes of vigorous-intensity activity per week (or combination) to promote greater health benefits
- Talk Test for intensity
- Activity can be adapted for things like arthritis and mobility limitations
- Don’t forget flexibility and balance activities!

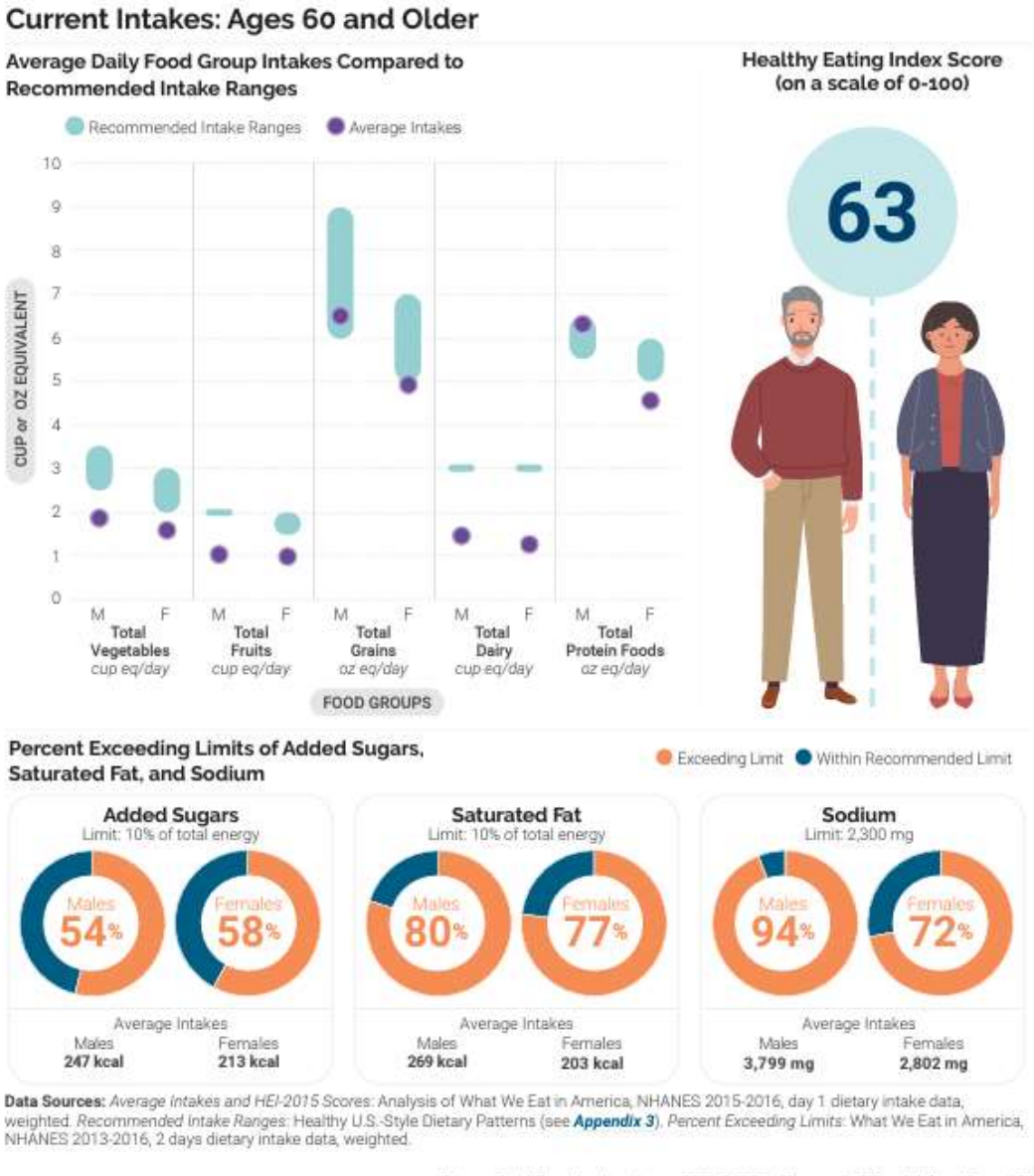
https://www.cdc.gov/physicalactivity/basics/adding-pa/activities-olderadults.htm

Heathy diet

assuming 1800 kcal

- 2.5 C vegetables/day
- 1.5 C fruit/day
- 3 C eq dairy/day
- 6 oz eq grains/day
- 5 oz eq protein/day
- 24 g oils/day
- 140 kcal for other uses

https://www.dietaryguidelines.gov/



- HIGHER ABDOMINAL ADIPOSE OVERALL INCREASES RISK OF CANCER
- VISCERAL ADIPOSE TISSUE IN THE ABDOMEN APPEARS TO BE PARTICULARLY PROBLEMATIC
- THERE MAY BE DIFFERENCES ACROSS POPULATIONS IN TERMS OF RISK THAT NEED TO BE CONFIRMED
- WE CAN IMPROVE BODY COMPOSITION AND CHRONIC DISEASE HEALTH RISKS WITH A HEALTHY DIET AND PHYSICAL ACTIVITY
    - EVEN IF ALREADY NORMAL BODY WEIGHT
    - EVEN IF WEIGHT DOES NOT CHANGE

SUMMARY

Thank you WHI Participants!

The WHISC TEAM

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  - ESI: Celina Valencia

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Questions?