# Analyzing Body Fat in Participants from Project TONE: An Exercise and Diet Intervention to Improve Body Composition in Postmenopausal Women with Normal BMI but Higher Body Fat


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## Higher body fat in postmenopausal women with normal BMI associated with cancer risk

- In postmenopausal women with normal BMI, higher body fat is associated with elevated risk of breast cancer.[1]
  - Concluded based on analysis of 3460 \postmenopausal women with normal BMI ages 50-79 years from the **Women's Health Initiative (WHI)** conducted 1993-1998.

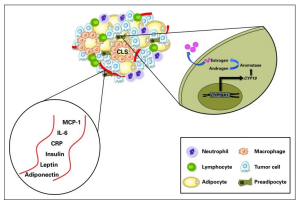


**Figure 1.** Higher body fat promotes breast cancer risk through local changes–including inflamed adipose tissue and an altered microenvironment–and systemic changes–including circulating metabolic and inflammatory factors.[2]

## Project TONE: Decreasing body fat in postmenopausal women with normal BMI

- Project TONE is an ongoing intervention to reduce body fat in postmenopausal women with normal BMI but higher body fat.
  - Intervention emphasizes strength and aerobic training, as well as high-quality diet with increased protein.

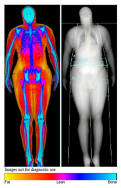

**Figure 2.** Screening process for Project TONE involves DXA scan to measure body fat levels of interested participants.[3]

## Research Question: How do body fat levels differ between postmenopausal women with normal BMI screened for Project TONE and those analyzed in the WHI?

## Screening postmenopausal women with normal BMI for Project TONE eligibility (ongoing)

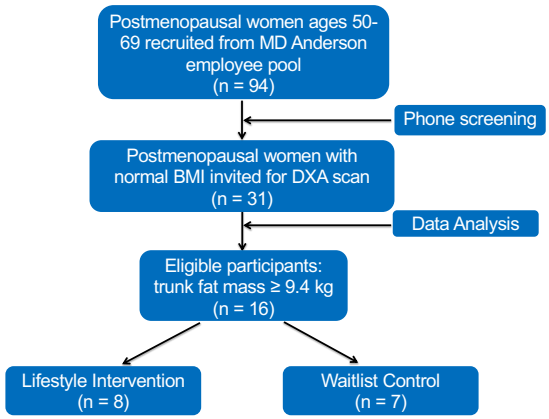


**Figure 3.** Consort diagram.

## Body fat levels in postmenopausal women with normal BMI screened for Project TONE higher than those analyzed in WHI

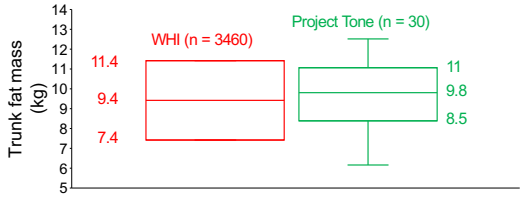


**Figure 4.** Quartiles 1 and 2 of trunk fat mass higher in postmenopausal women with normal BMI screened for Project TONE compared to those analyzed in WHI.

| Measure | WHI (n = 3460) | Project TONE (n = 30) |
|---|---|---|
| **Age (years), mean** | **63.6** | **57.3** |
| **BMI (kg/m²), mean** | **22.6** | **23.3** |

**Figure 5.** Mean age lower and mean BMI higher in postmenopausal women with normal BMI screened for Project TONE compared to those analyzed in WHI.

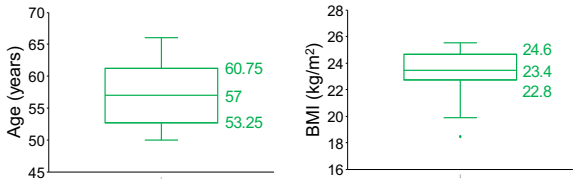


**Figure 6.** Box plots of age and BMI distributions in postmenopausal women with normal BMI screened for Project TONE.

## Body fat and cancer risk potentially higher now (2020s) than before (1990s)

- Central adiposity, as indicated by trunk fat mass, is higher on average in postmenopausal women with normal BMI screened for Project TONE compared to women from the WHI.
  - Could be a result of changes in diet, food culture, and physical activity.
  - Could also be related to differences between the two groups in age, BMI, location, etc.
- Given that higher body fat is a potential risk factor for breast cancer, lifestyle strategies are needed to promote favorable body composition phenotypes (e.g., lower body fat, adequate muscle mass) in our population of interest.

## Next Steps: Completion of Project TONE and further exploration of body fat variables in participants

- Assess efficacy of Project TONE by measuring changes in body fat, as well as circulating biomarkers of inflammation and metabolism before and after intervention.
- Assess feasibility of Project TONE based on rates of eligibility, intervention adherence, and retention.
- Continue to analyze body fat variables in screened participants outside of just trunk fat mass.

## References


[1]Iyengar, N. M., et al. (2019). Association of Body Fat and Risk of Breast Cancer in Postmenopausal Women With Normal Body Mass Index: A Secondary Analysis of a Randomized Clinical Trial and Observational Study. *JAMA Oncology, 5(2)*, 155-163. doi: 10.1001/jamaoncol.2018.5327

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[3]Shepherd, J. A., Ng, B. K., Sommer, M. J., & Heymsfield, S. B. (2017). Body composition by DXA. *DXA: 30 Years and Counting, 104*, 101–105. doi: 10.1016/j.bone.2017.06.010


## Responsible Conduct of Research

The MD Anderson PI Dr. Karen Basen-Engquist submitted a research protocol for Project TONE and obtained research approval from partner institutions.
We worked to protect data from participants recruited and screened for Project TONE.

## Acknowledgements


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