

The Beef WISE Study: Beef's Role in Weight Improvement, Satisfaction, and Energy


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Disclosures

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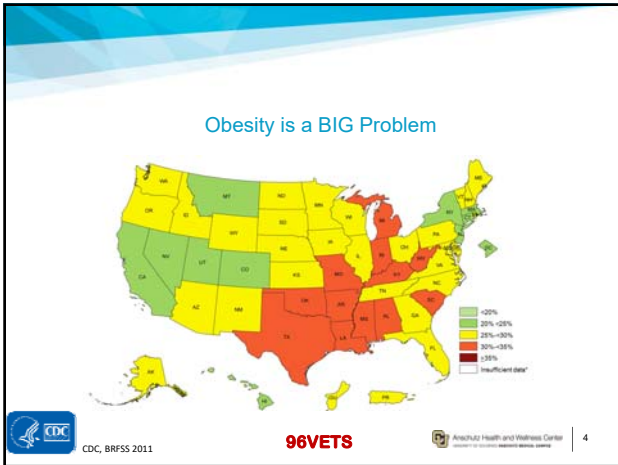
Funded by Beef Farmers & Researchers

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Presentation Outline

- **Why** did we conduct the Beef WISE Study?
- **How** did we conduct the study?
- **What** did we find?
- **Why** should you care?

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Obesity is a BIG Problem... with Immense Public Health and Financial Costs

- **Major risk factor for type 2 diabetes**
 - Men: RR of **42.1** for BMI >35 kg/m² vs. <23 kg/m² ¹
 - Women: RR of **93.2** for weight gain to BMI >35 kg/m² vs. <22 kg/m² ²
- **46% (men) and 64% (women) increased risk of CVD³**
 - Obesity associated increases in blood pressure and lipids
- **13 cancers associated with obesity⁴**
 - 2/3 of all cancers in adults 50 – 74 years of age
- **\$147 billion in 2008 and 42% more than normal weight⁵**

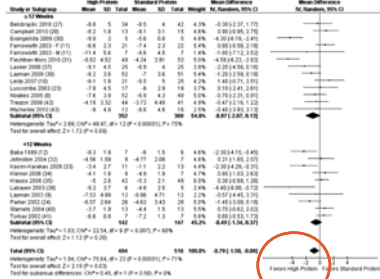
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 2. Colditz GA et al. Ann Intern Med. 1995. 122(7): p. 481-6.
 3. Wilsson et al. Arch Intern Med. 2002. 162(16): p. 1867-72.
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Higher Protein Diets for Weight Loss

- Higher protein diets tend to increase weight loss and reduce loss of lean/muscle mass compared to normal protein diets^{1,2,3}
 - Satiety/Fullness
 - Energy expenditure
- Improved cardiovascular disease risk factors^{1,2,3}
- Others shown no benefit or detriment⁴

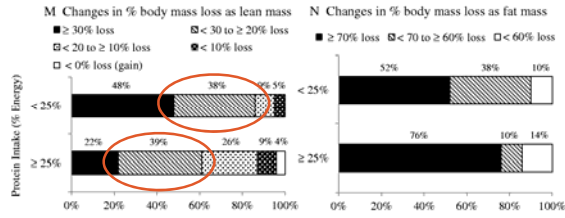
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 2. Santesso N et al. Eur J Clin Nutr 2012;66:780-8.
 3. Wycherley TP et al. Am J Clin Nutr 2012;96:1281-98.
 4. Schwingshackl L et al. Nutr J 2013;12:48.

Greater Weight Loss with Higher vs. Standard Protein, Low-Fat Diets



Wycherley TP et al. Am J Clin Nutr 2012;96:1281-98.

Higher Protein Diets Improve Body Composition and Promote Retention of Lean Mass



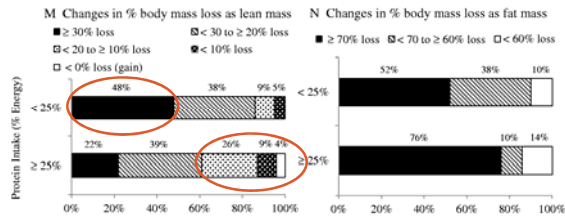
Kim JE et al. Nutr Rev 2016;74:210-224.

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Higher Protein Diets Improve Body Composition and Promote Retention of Lean Mass



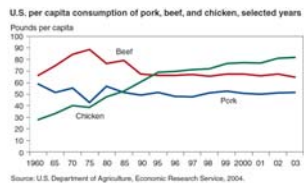
Kim JE et al. Nutr Rev 2016;74:210-224.

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Red Meat and Beef in the U.S. Diet



- Meat intake comprises 40% of total protein intake¹
- 58% of total meat intake from red meats¹
- Beef is the most commonly consumed red meat
- Second to chicken among all meats

1. Daniel CR et al. Public Health Nutr 2011;14:575-83.

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Red Meat Intake and Health

- 2015 Dietary Guidelines: diets reduced in red meat are associated with lower risk of obesity¹
- Observational data suggest increased risk of CVD², diabetes³, and cancer⁴
- Data from randomized trials generally find no adverse (or beneficial) influence of red meat intake



1. Dietary Guidelines for Americans 2015-2020, Eighth Edition
2. Chen GC et al. Eur J Clin Nutr. 2013;67:91-5.
3. Micha R et al. Curr Atheroscler Rep. 2012;14:515-24.
4. Chan DS et al. PLoS One. 2011;6:e20456.

Limitations of Past Randomized Trials

- **BOLD¹ and DASH-pork² studies**
 - No negative influence of red meat on study outcomes
 - Conducted during weight maintenance
 - Subjects had high cholesterol and pre-hypertension
- **Two weight loss trials^{3,4}**
 - No negative influence of red meat on weight loss or CVD risk
 - Small sample sizes, lack of HP control diet with no red meat, and manipulation of multiple dietary components

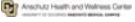
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2. Sayer RD et al. Am J Clin Nutr. 2015;102:302-308.
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4. Ziegler D et al. Diabetes Care. 2015;38:1750-1757.

Study Objective

Overall Aim: To determine the impact of consuming lean beef as part of a higher-protein, weight-reducing diet on changes in body weight, body composition (fat and lean mass), cardiometabolic health, and diet satisfaction.



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The Beef WISE Study: Beef's Role in Weight Improvement, Satisfaction, and Energy

- Randomized equivalence trial in 120 adults with obesity
- **Beef:** ≥ 4 weekly servings of lean beef
Non-Beef: No red meat during study period
- All subjects completed 16-week *State of Slim* comprehensive weight management program and 8-week follow-up period
- Assessments were completed at baseline, week 16, and week 24 (except body composition)



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State of Slim Overview

STATE of SLIM

HIGHLIGHTS


- 16-week program to “fire up” your metabolism
- Science and behavior based curriculum
- Facilitated in group setting, with up to 20 people
- Foods are based on portion control (not counting calories)
- Working from 10 minutes up to 70 minutes of exercise
- Mind-set experiential practice to provide tools for sustainable behavior change
- Accountability from certified coach, social/group support
- Life Transformation

Phases of the Diet

- Phase 1: Reignite metabolism (2 weeks)
- Phase 2: Rebuild metabolism (6 weeks)
- Phase 3: Reinforce metabolism (8 weeks)

Non-Negotiables

- Eat a meal within an hour of waking up
- Eat five to six meals a day
- Exercise 6 days a week
- Indulgence meals in Phase 2 and 3
- Submit weekly homework assignments


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Hypotheses

Hypothesis 1: Equivalent weight loss between groups.

Hypothesis 2: No difference in changes in body composition and cardiometabolic health between groups.


Hypothesis 3: No difference in hunger and fullness ratings between groups.

Hypothesis 4: Greater cravings and feelings of deprivation and reduced diet satisfaction in Non-Beef vs. Beef.

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Statistical Analysis

- Equivalence in weight loss (primary aim) assessed using the difference in mean percent weight loss between Beef and Non-Beef plus 90% confidence interval.
- Other study outcomes assessed using linear mixed models to test for effects of group, time, and group x time interaction.
- Values reported as LSMEANS ± Standard Error
 - Baseline characteristics as Mean ± SD

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Baseline Subject Characteristics

	All	Beef	Non-Beef
Age (y)	38 ± 8	36 ± 8	39 ± 8*
Body Weight (kg)	101.1 ± 22.8	100.8 ± 21.9	101.5 ± 24.0
BMI (kg/m ²)	35.7 ± 7.0	35.9 ± 6.8	35.4 ± 7.1
Glucose (mg/dL)	94 ± 10	94 ± 10	94 ± 9
Total Chol (mg/dL)	168 ± 34	169 ± 36	167 ± 33
LDL-C (mg/dL)	100 ± 29	101 ± 31	98 ± 26
HDL-C (mg/dL)	47 ± 10	45 ± 9	48 ± 11
TG (mg/dL)	104 ± 50	107 ± 49	100 ± 52
Hemoglobin A1c (%)	5.45 ± 0.4	5.39 ± 0.4	5.52 ± 0.4
SBP (mm Hg)	117 ± 11	116 ± 10	117 ± 12
DBP (mm Hg)	76 ± 8	76 ± 9	77 ± 8

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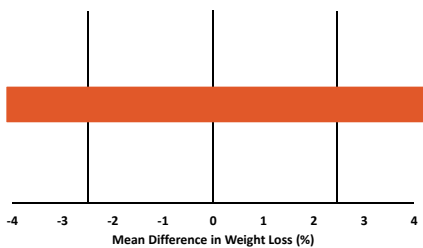
Beef and Red Meat Intakes

- **Beef:** Reported consuming ~5 weekly servings of beef throughout the study and no additional red meat
 - Serving = 4-6 ounces
- **Non-Beef:** Reported no consumption of beef or other red meats during the study

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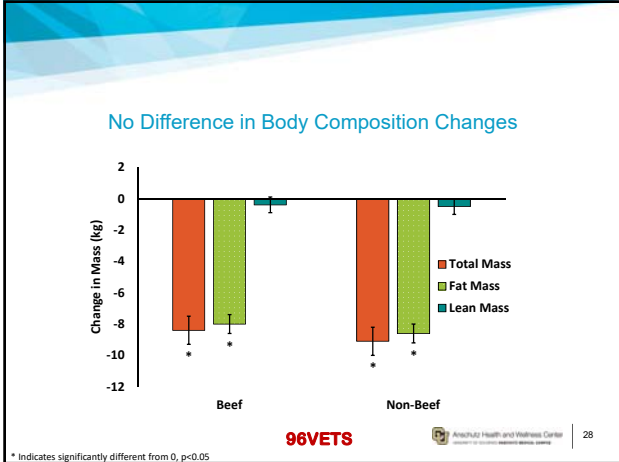
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Difference in Weight Loss between Beef and Non-Beef



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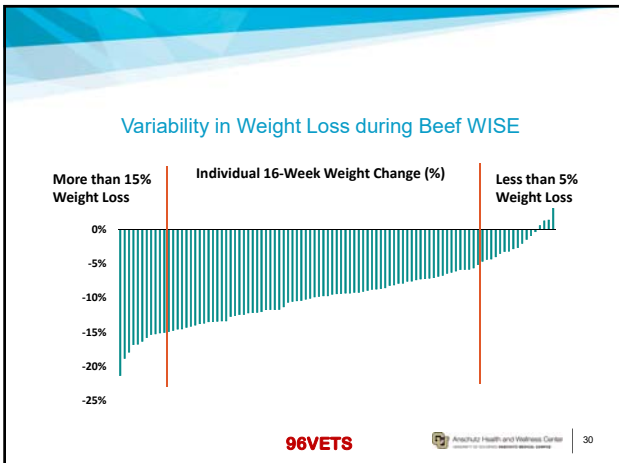
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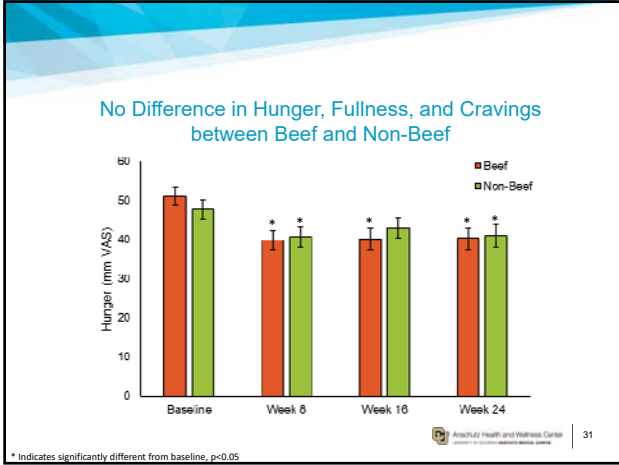


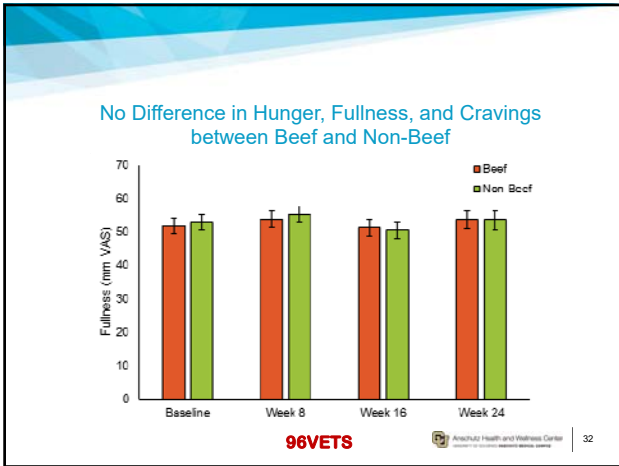
Improved Cardiometabolic Health in Beef and Non-Beef

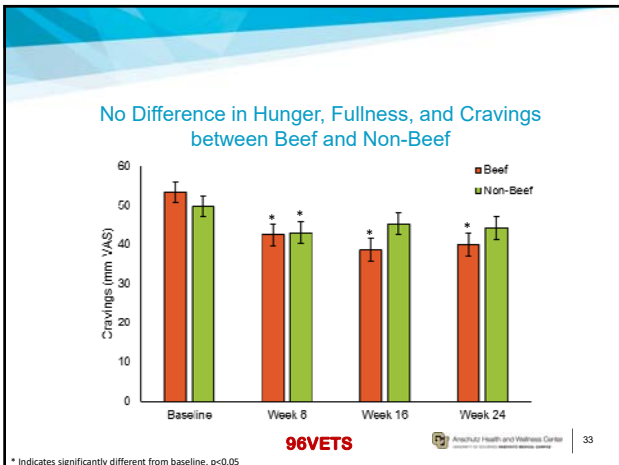
	Group	Baseline	Week 16	Difference
Total Chol (mg/dL)	Beef	169 ± 4	156 ± 4	12 ± 3
	Non-Beef	167 ± 4	153 ± 4	14 ± 3
LDL-C (mg/dL)	Beef	101 ± 3	93 ± 4	8 ± 2
	Non-Beef	98 ± 4	89 ± 4	9 ± 2
TG (mg/dL)	Beef	107 ± 1	85 ± 6	22 ± 5
	Non-Beef	100 ± 6	82 ± 6	18 ± 5
SBP (mm Hg)	Beef	116 ± 2	111 ± 2	5 ± 1
	Non-Beef	117 ± 2	109 ± 2	8 ± 1
DBP (mm Hg)	Beef	76 ± 1	72 ± 1	3 ± 1
	Non-Beef	77 ± 1	72 ± 1	5 ± 1

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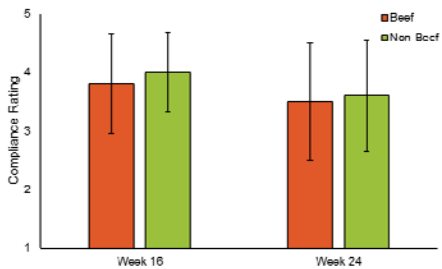


Baseline Hunger and Cravings Predict Weight Loss

- Greater baseline hunger ($r = -0.22, p = 0.031$) and cravings ($r = -0.20, p = 0.48$) related to less weight loss
- Hunger and cravings during the intervention were not related to weight loss
- Fullness was not related to weight loss at any time point

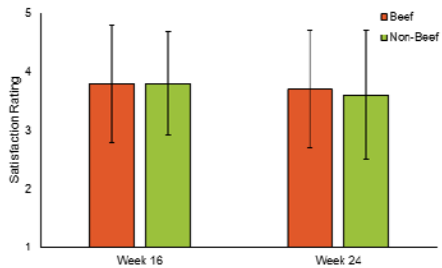
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Dietary Compliance, Satisfaction, and Deprivation

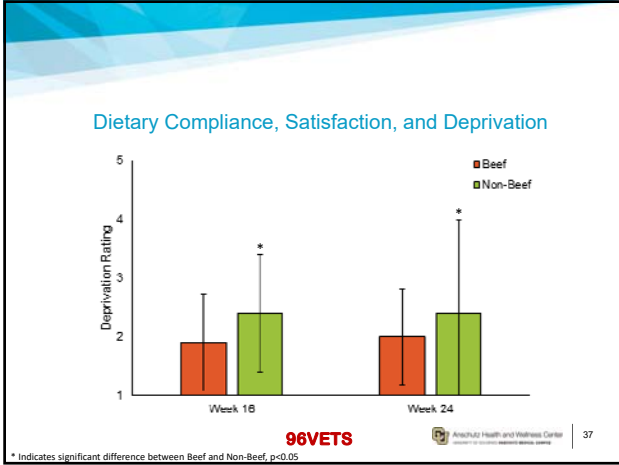


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Dietary Compliance, Satisfaction, and Deprivation



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Self-Reported Compliance, Satisfaction, and Deprivation Are Related to Weight Loss

- Higher compliance ($r = 0.52, p < 0.001$) and satisfaction ($r = 0.33, p = 0.001$) with the diet associated with greater weight loss
- Higher deprivation ($r = -0.21, p = 0.043$) associated with less weight loss

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Beef WISE Summary and Conclusion

Summary

- Equivalent weight loss
- No difference in improvements in body composition and cardiometabolic health
- No difference in reductions in reported hunger and cravings
- Dietary compliance and satisfaction were high and not different between groups
- Overall deprivation was low, but lower in Beef vs. Non-Beef

Beef WISE Summary and Conclusion

Conclusions

- HP diets – either rich or restricted in red meat intakes – are effective for decreasing body weight (especially body fat) and improving cardiometabolic health.
- Screening for high hunger and cravings prior to initiating weight loss to identify patients requiring more intensive treatment.
- Develop strategies to promote reduced feelings of hunger, craving, and deprivation to increase dietary adherence and improve behavioral weight loss outcomes.


Take Home Points

- Consuming ~5 weekly servings of lean beef did not impact weight loss or weight loss-induced improvements in body composition and cardiovascular disease risk
 - Note: No evidence of detriment OR benefit of consuming lean beef during weight loss
- We found no indication that individuals need to restrict their consumption of lean beef while attempting to lose weight and improve their cardiovascular health

Take Home Points

For those already consuming beef:


- Choose minimally processed cuts that meet USDA criteria for lean or extra lean. **16 of 25** most popular beef cuts.
 - Look for "...loin", "round," and strip steak
 - Trim visible fat. Especially for cuts that do not meet "lean" criteria
 - T-bone, Porterhouse, Short Ribs, "Chuck"
- Be aware of serving sizes
 - 4 – 6 oz per serving
 - Deck of cards is ~3 oz

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Take Home Points

For those not currently consuming beef:

- Fine. No evidence of **detriment or benefit** of beef consumption for weight loss in our study

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Question and Answer

Email me with any questions: drew.sayer@ucdenver.edu

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