PA, Exercise and Youth Obesity:

Refocusing efforts from weight-loss to health gains

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Outline

- Building the conceptual case
- Experimental data supporting exercise
- Translating research to practice
- Future directions

Conceptual Case

- Long-term successful weight loss is challenging
  - ~20% are “successful” Wing and Hill 2001
- Most youth who are obese remain obese
  - Pediatric obesity is highly heritable Bouchard 2009
- PA is protective against morbidity and mortality
  - Independent of obesity Ekelund 2015

What is the role of exercise in health promotion/disease prevention among youth who are obese?

Treatment of Obesity?

- Gutin / Owens 5x's / wk of AT >150 BPM for 4 months
- Treuth 3x's / wk of PT 50-70% 1RM for 5 months

Study	n	Duration
Gutin et al.[34]	34	4mo

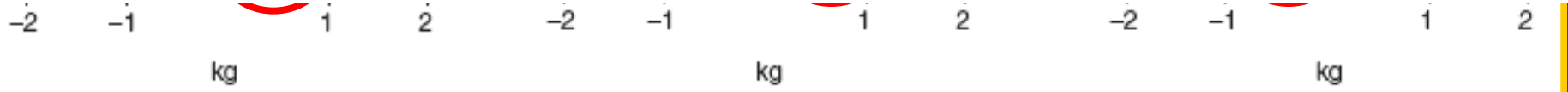
Review Article

Effects of Exercise in the Treatment of Overweight and Obese Children and Adolescents: A Systematic Review of Meta-Analyses

George A. Kelley[1] and Kristi S. Kelley[2]

Journal of Obesity
Volume 2013, Article ID 783103, 10 pages

...significant reductions in percent body fat were observed but no other measures of adiposity (BMI-related measures, body weight, and central obesity) were statistically significant.....



Exercise and Cardiometabolic Disease Prevention

Effects of exercise on resting blood pressure in obese children: a meta-analysis of randomized controlled trials

obesity reviews (2013) **14**, 919–928

A. García-Hermoso, J. M. Saavedra and Y. Escalante

Review

Preventive Medicine 54 (2012) 293–301

Improvement of the lipid profile with exercise in obese children: A systematic review

Yolanda Escalante *, Jose M. Saavedra, Antonio García-Hermoso, Ana M. Domínguez

Facultad de Ciencias del Deporte, AFIDES Research Group, Universidad de Extremadura, Avda. Universidad s/n, 10071-Cáceres, Spain

Exercise and Insulin Resistance in Youth: A Meta-Analysis

PEDIATRICS Volume 133, Number 1, January 2014

AUTHORS: Michael V. Fedewa, MA,[a] Nicholas H. Gist, PhD,[a,b] Ellen M. Evans, PhD,[a] and Rod K. Dishman, PhD[a]

[a]Department of Kinesiology, University of Georgia, Athens, Georgia; and [b]Department of Physical Education, United States Military Academy, West Point, New York

Exercise protects the cardiovascular system: effects beyond traditional risk factors

Michael J. Joyner[1] and Daniel J. Green[2,3]

J Physiol 587.23 (2009) pp 5551–5558

- Risk Factor Gap - exercise appears to be far more protective than it should be based on changes in traditional risk factors alone

- The long subclinical period between elevated risk and eventual disease outcome in youth suggests that the risk factor gap may be even wider in pediatric populations

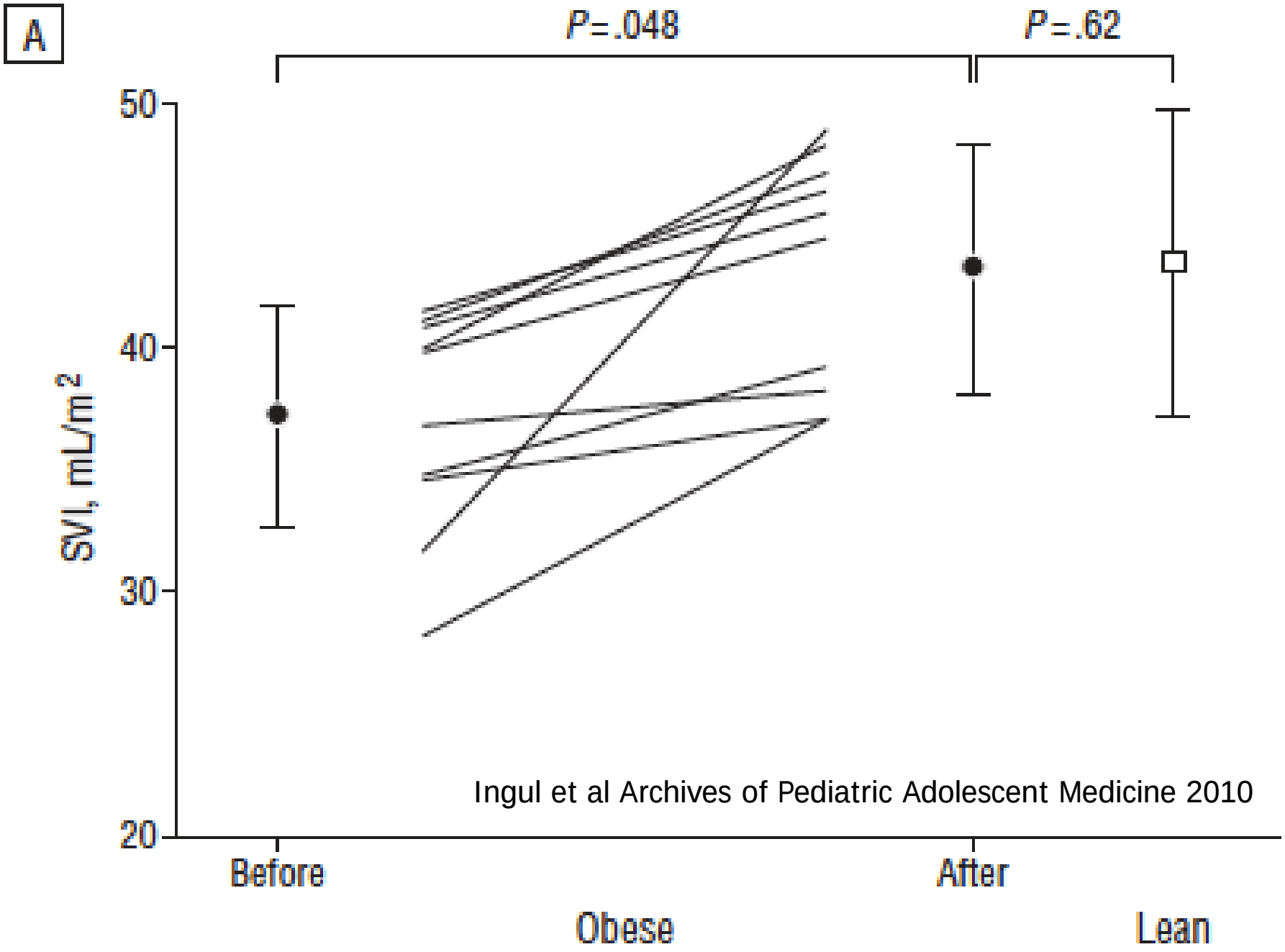
Impaired Cardiac Function Among Obese Adolescents

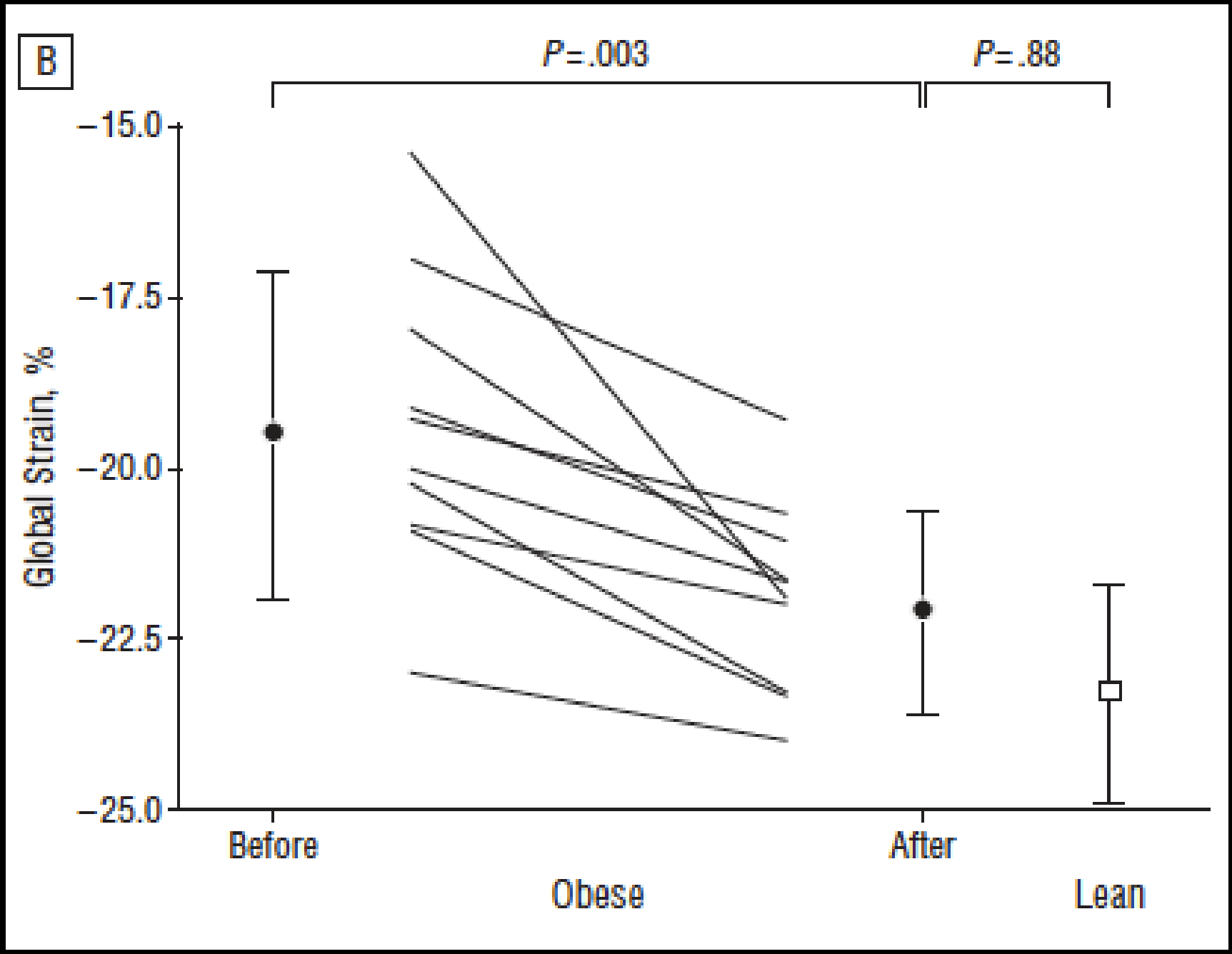
Effect of Aerobic Interval Training

Charlotte Bjork Ingul, MD, PhD; Arnt Erik Tjonna, PhD; Tomas Ottemo Stolen, PhD; Asbjorn Stoylen, MD, PhD; Ulrik Wisloff, PhD

- Purpose: To examine the effects of high-intensity interval training (2 x's / week for 13 weeks) on cardiac function (echocardiography) in 10 obese adolescents

Archives of Pediatric Adolescent Medicine 2010


A
P=.048
P=.62
50
40
30
20
SVI, mL/m2
Before
After
Obese
Lean
Ingul et al Archives of Pediatric Adolescent Medicine 2010



Ingul et al Archives of Pediatric Adolescent Medicine 2010

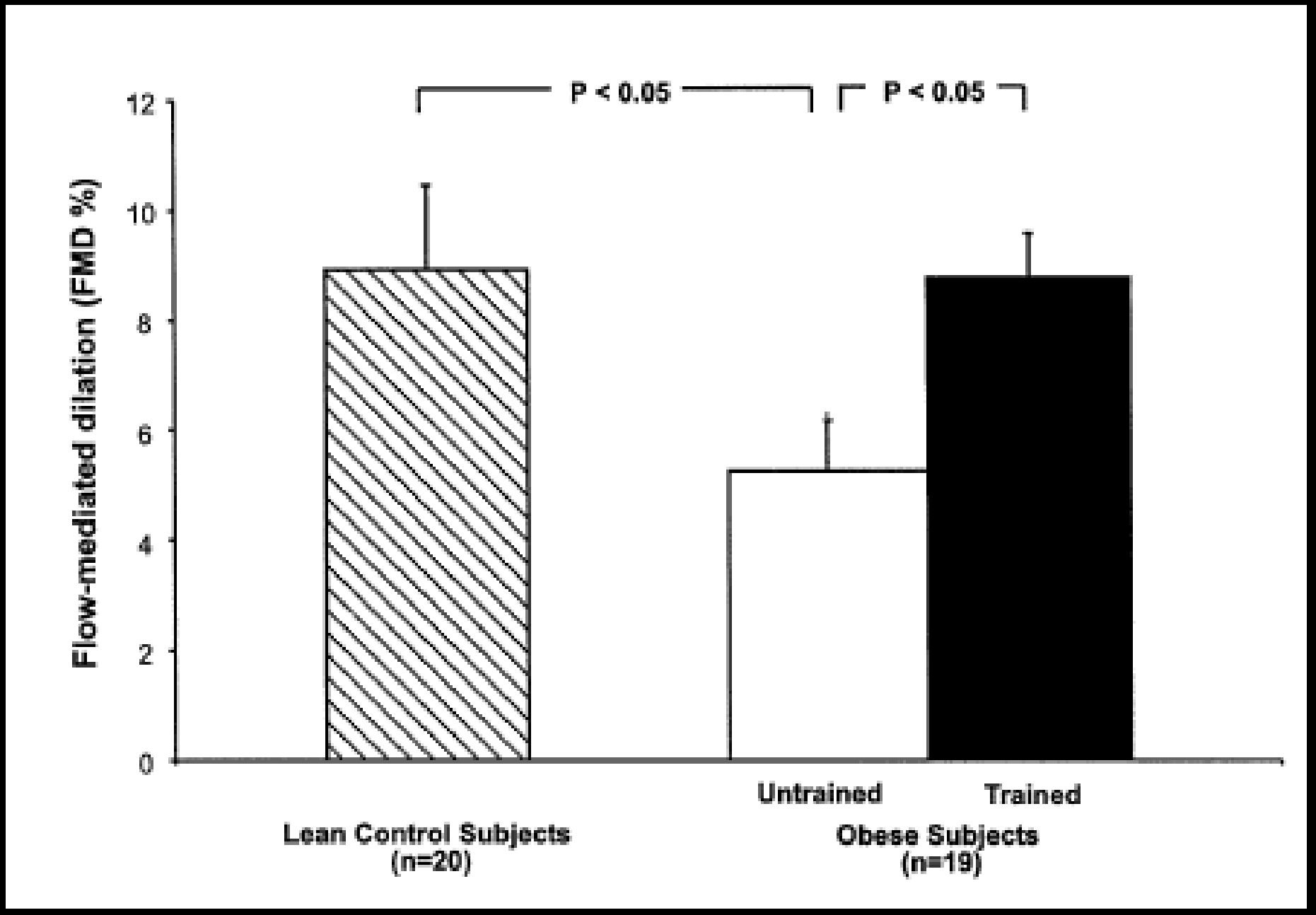
Exercise Training Normalizes Vascular Dysfunction and Improves Central Adiposity in Obese Adolescents

Katie Watts, BSc(Hons),* Petra Beye, MD,† Aris Siafarikas, MD,† Elizabeth A. Davis, FRACP,†‡
Timothy W. Jones, FRACP,†‡ Gerard O'Driscoll, FRACP,*§ Daniel J. Green, PhD*§
Crawley, Subiaco, and Perth, Western Australia

- Purpose: To examine the effects of circuit training (3x's / week for 8 weeks) on vascular function in 19 adolescents who are obese

- Endothelial function by brachial Artery FMD

Journal American College Cardiology 2004



Watts et al Journal American College Cardiology 2004

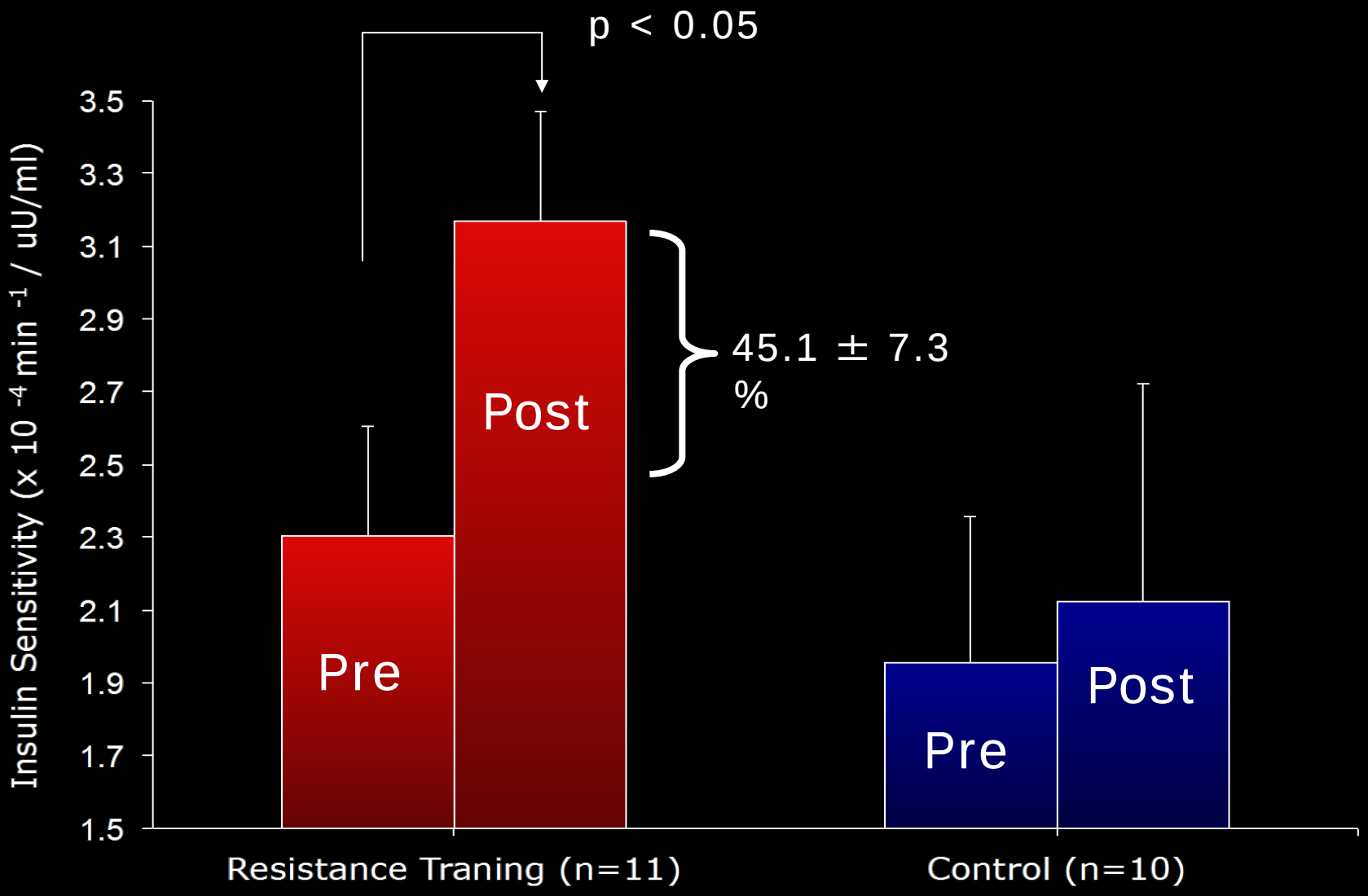
Effects of Resistance Training on Insulin Sensitivity in Overweight Latino

Med. Sci. Sports Exerc., Vol. 38, No. 7, pp. 1208 – 1215, 2006.

GABRIEL Q. SHAIBI[1], MARTHA L. CRUZ[2], GEOFF D. C. BALL[3], MARC J. WEIGENSBERG[4], GEORGE J. SALEM[1], NOE C. CRESPO[5], and MICHAEL I. GORAN[5,6]

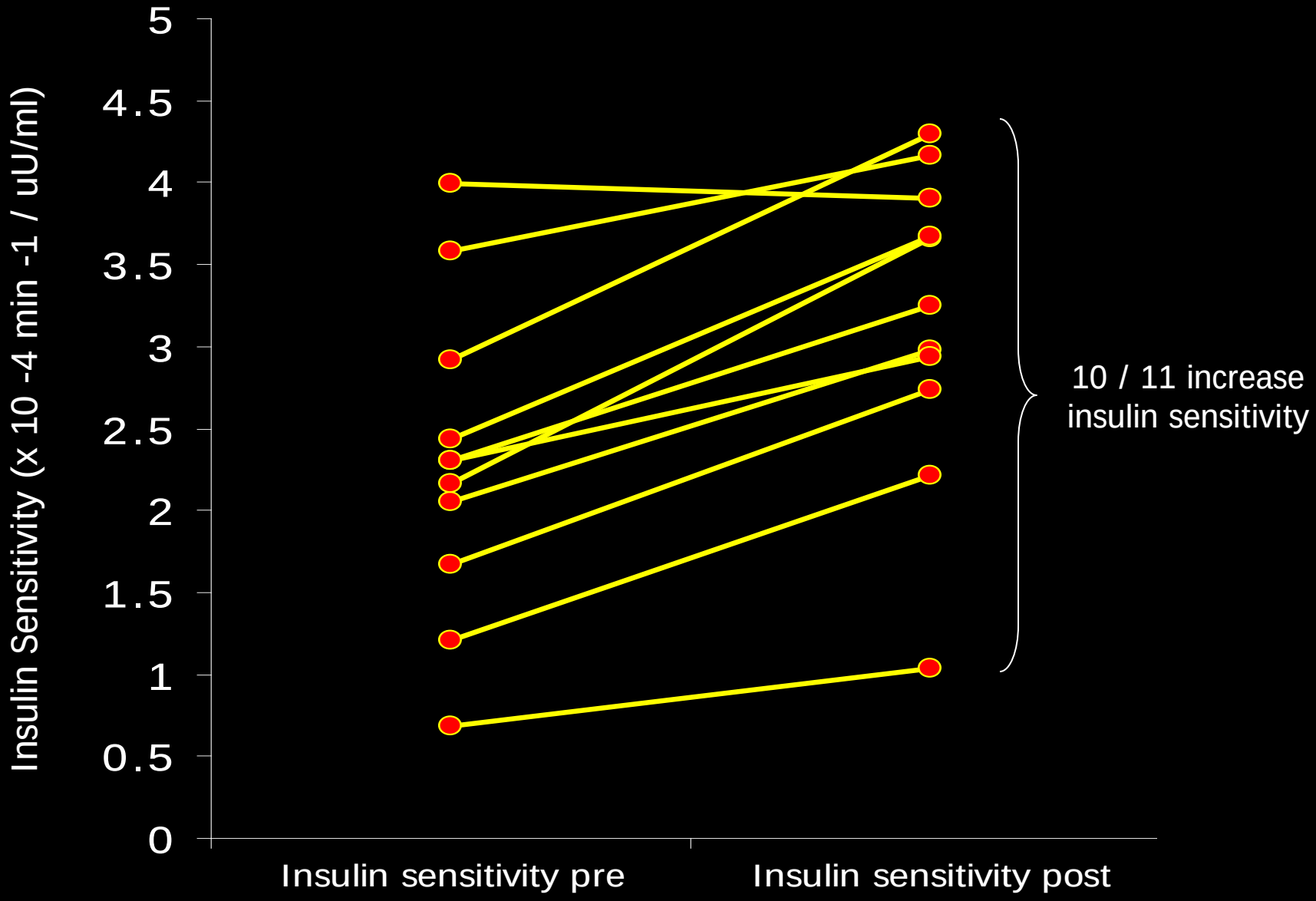
- Purpose: To examine the effects of resistance training (2x's / week for 16 weeks) on insulin sensitivity in Latino adolescents who are obese
  - Insulin action: FSIVGTT
  - Body Composition: DXA

Changes in Insulin Sensitivity



Shaibi et. al. 2006

Individual Changes in Insulin Sensitivity

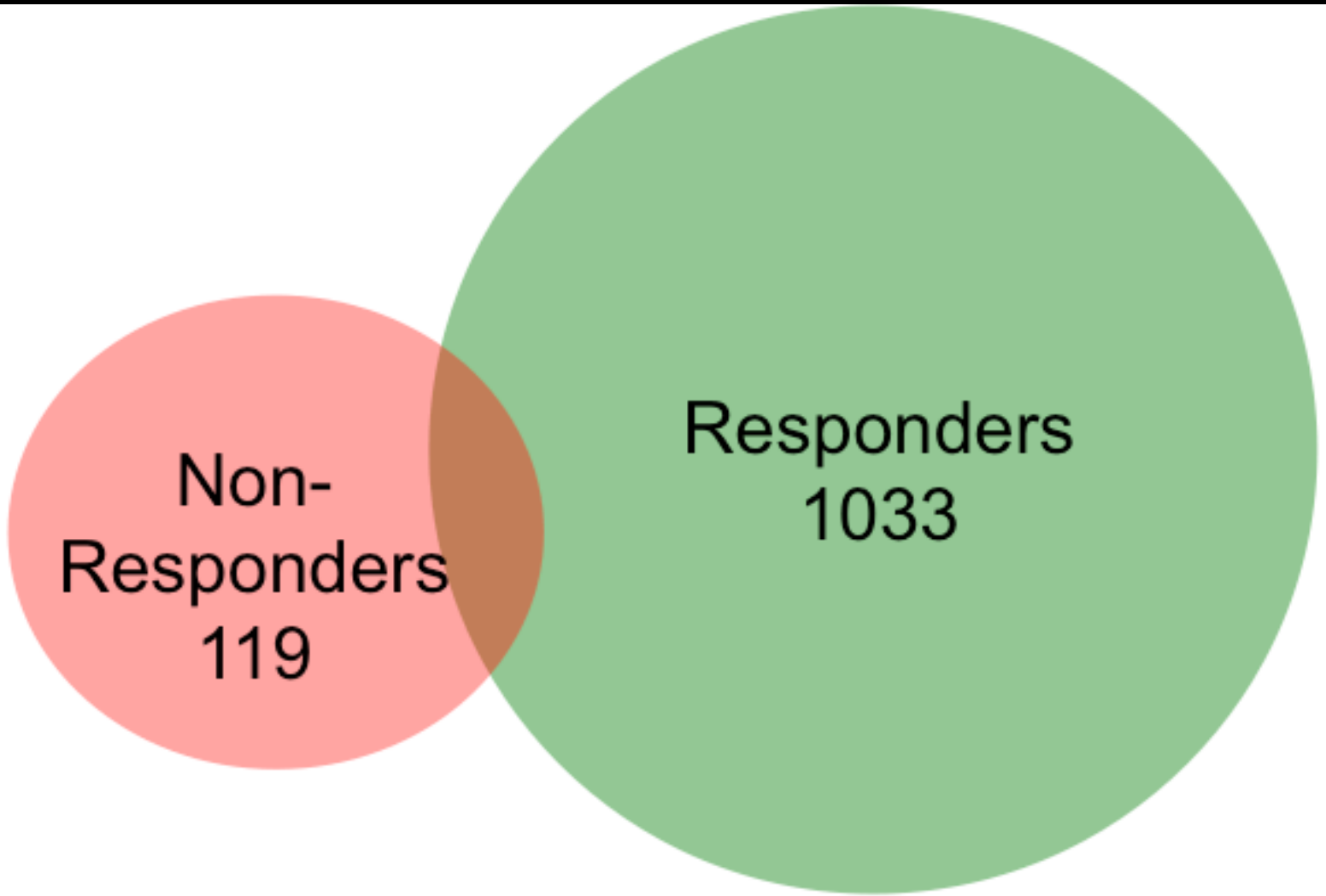


Shaibi Medicine Science Sports Exercise 2006

Effects of a Culturally Grounded Community-Based Diabetes Prevention Program for Obese Latino Adolescents

Shaibi et al Diabetes Educator Vol 38, Num 4, July/August 2012

Gene x Environment Interaction?



Responders (Green) exhibited increases in insulin sensitivity in response to the lifestyle intervention and non-responders (Red) did not.

Research to Practice to Policy

- Exercise “prescriptions” in clinical practice
  - Assessments beyond weight (BMI)
  - Incorporation of behavioral change strategies
    - Goal setting, role modeling, social support
  - Integration with community programs

- Policy
  - Reimbursement
  - Incentives
  - Education / Training

Pediatric Exercise is Medicine™

- Targeted populations
  - BMI is not good enough
- Meaningful outcome measures
  - Proximal to disease process
  - Psychosocial / emotional health
- Optimizing exercise parameters
  - Dose response studies
- Appropriate designs
  - RCT vs. CET

Thank You!