



# Energy Balance at a Crossroads: Translating Science into Action Consumer Confusion on All Sides of the Calorie Equation

**Audio Information:** 

Dial-In: 800-658-3095

Access code: 964856914#

#### A joint webcast presented by:

**ILSI North America** 

Academy of Nutrition and Dietetics

American College of Sports Medicine

International Food Information Council Foundation













### **Objectives**

- To communicate the latest science on biological and lifestyle factors that impact energy balance recently reported in the joint publication of "Energy Balance at a Crossroads: Translating the Science into Action" in the *Journal of Academy of Nutrition and Dietetics* as well as *Medicine & Science in Sports & Exercise*.
- To identify and relay the biological, lifestyle, and environmental changes that will most successfully help children and families attain and manage energy balance and tip the scale toward healthier weights.
- To translate the science of energy balance into practical and appropriate recommendations for training current and future professionals in nutrition, exercise/physical activity (PA), health education and pre-K-12 teacher education.





### Housekeeping

- Dial-In Information NOTE: All lines are force-muted.
  - Toll free number: 800-658-3095
  - Passcode: 964856914
  - International number: 001 (240) 724-6048
- Got Questions? Please email <u>FOODANDHEALTH@IFIC.ORG</u>
  - We will address questions throughout the webcast.
- Join the conversation on Twitter by following @FoodInsight and/or using the hashtag #FoodInsight.





### The Challenge

Improve the Nation's health by improving the number of young people moving into adulthood without the burden of obesity and its associated chronic diseases.





### Background

Expert Panel meeting convened in October 2012, Washington, DC by ACSM, AND, and the USDA/Agriculture Research Service (ARS)

#### **Desired Outcome:**

Translate the science of energy balance into pratical and appropriate recommendations for training current and future professionals in nutrition, exercise/physical activity, health education and pre-K-12 teacher education





### Background

#### **Joint Publications:**

Manore M, Brown K, Houtkooper L, Jakicic J, Peters J, Smith Edge M, Steiber A, Dorn J, Going S, Guillermin Gable L, Krautheim A.

**Energy Balance at a Crossroads: Translating the Science into Action.** 

Journal of the Academy of Nutrition and Dietetics (JAND) 2014; 114 (7) 113-9

Medicine & Science in Sports & Exercise (MSSE) 2014; 46(7): 1466-73





#### **Speakers**



John Jakicic, PhD
University of Pittsburgh



Katie Brown, Ed.D, RD, LD
Academy of Nutrition and Dietetics Foundation



Marianne Smith Edge, MS, RD, LD, FADA International Food Information Council Foundation





# Examining Biological and Lifestyle Factors Influencing the Dynamic Nature of Energy Balance

John M. Jakicic, Ph.D.
University of Pittsburgh
Professor and Chair
Department of Health and Physical Activity
Director, Physical Activity and Weight Management
Research Center





# American College of Sports Medicine AMERICAN COLLEGE OF SPORTS MEDICINE

ACSM is the largest sports medicine and exercise science organization in the world.

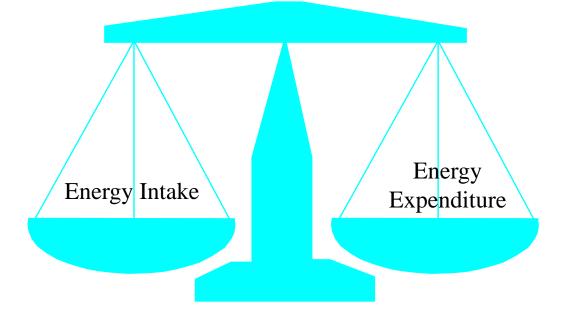
With more than 50,000 members and certified professionals worldwide, ACSM is dedicated to advancing and integrating scientific research to provide educational and practical applications of exercise science and sports medicine.

#### **Our Mission**

The American College of Sports Medicine advances and integrates scientific research to provide educational and practical applications of exercise science and sports medicine.

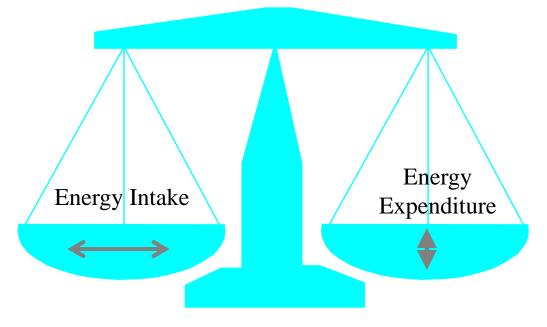






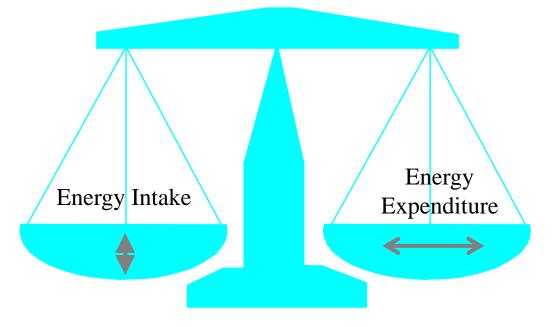






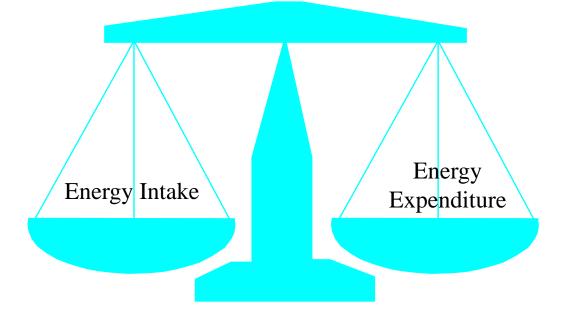






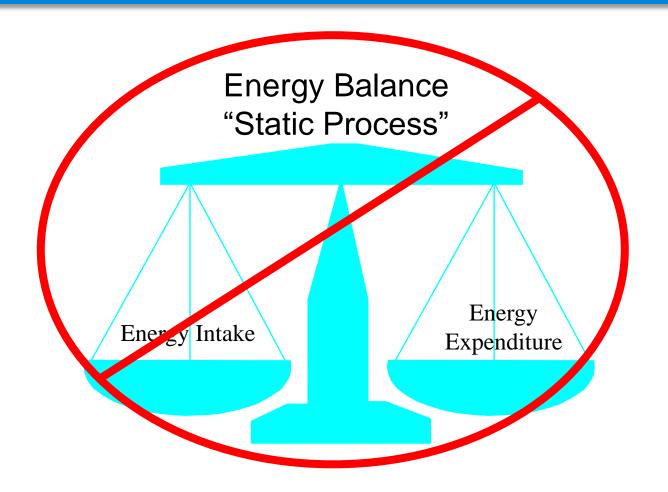






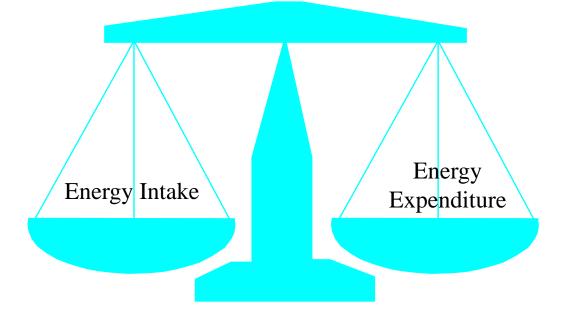






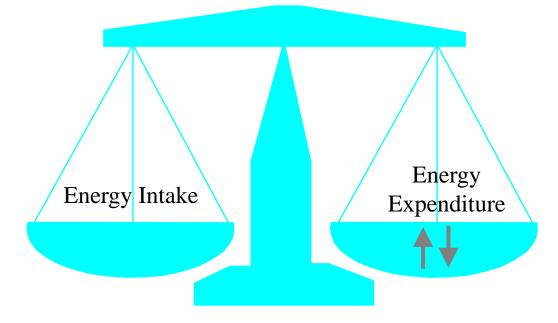






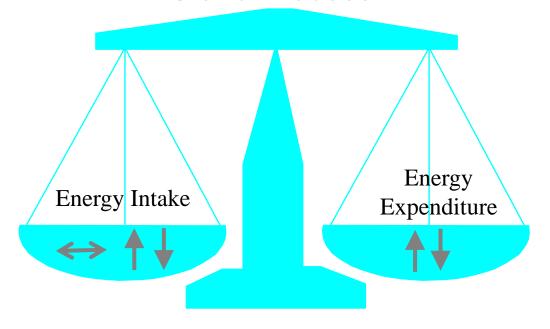






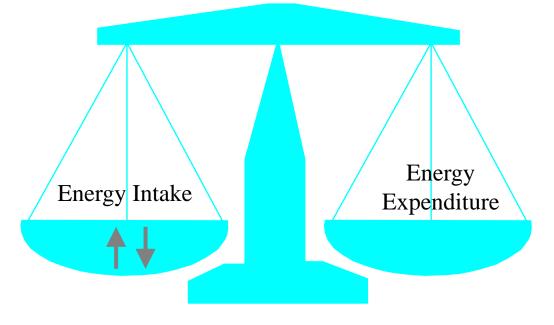






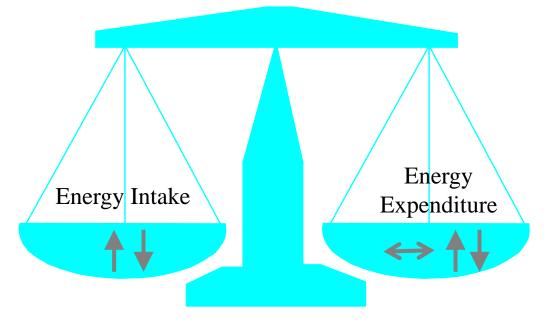








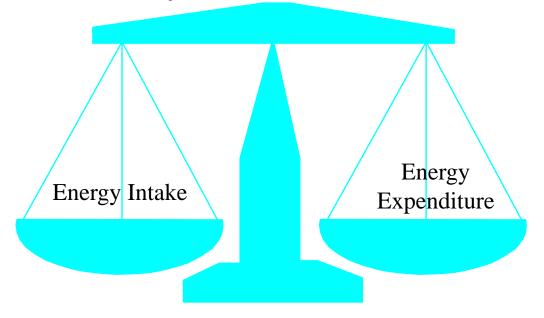








# Energy Balance "Dynamic Process"



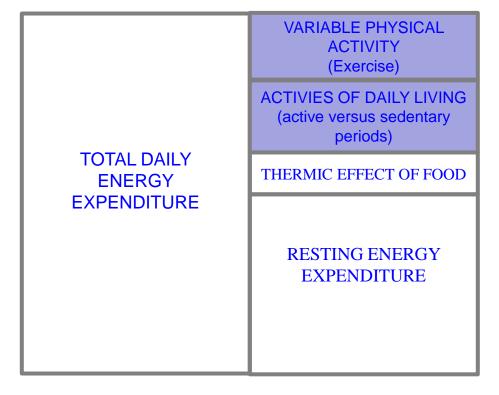




#### **PHYSICAL ACTIVITY TOTAL DAILY** THERMIC EFFECT OF FOOD **ENERGY EXPENDITURE RESTING ENERGY EXPENDITURE**







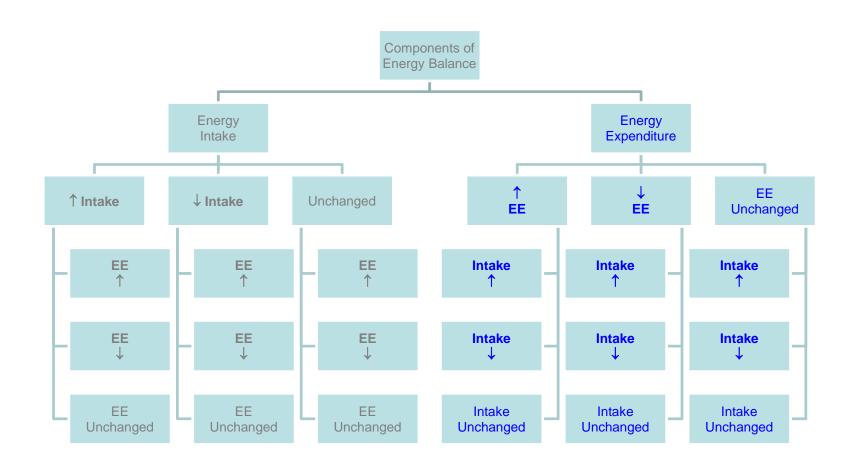




# Does Energy Intake Influence Energy Expenditure?



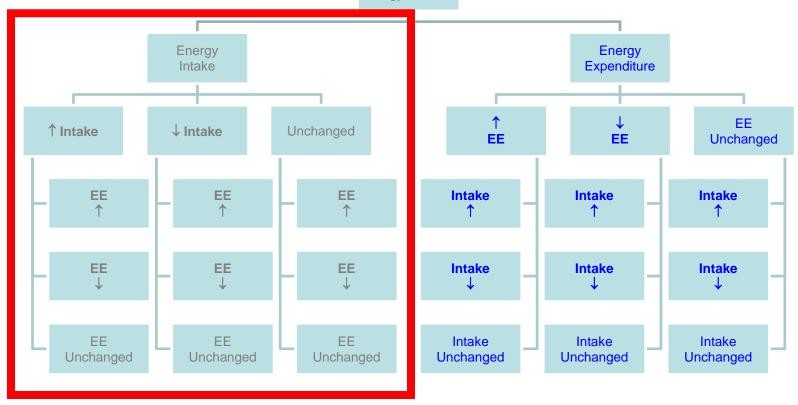








#### Components of Energy Balance







TOTAL DAILY ENERGY EXPENDITURE VARIABLE PHYSICAL ACTIVITY (Exercise)

ACTIVIES OF DAILY LIVING (active versus sedentary periods)

THERMIC EFFECT OF FOOD

RESTING ENERGY EXPENDITURE

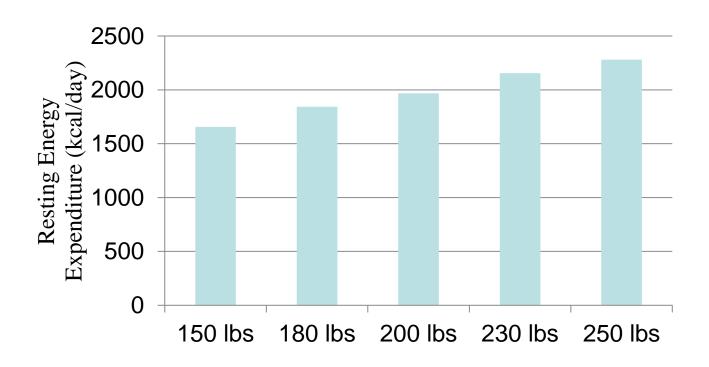


# If there is a chronic increase in calorie intake will energy expenditure increase?





If there is a chronic increase in calorie intake will energy expenditure increase?



Reference: 31-40 year old male, 70 inches in height



# If there is a chronic decrease in calorie intake will energy expenditure change?





#### **Experimental Condition:**

- Dietary Intake
  - 1200-1500 kcal/d
  - Fat intake = 20-30% of total dietary intake
  - Subjects attended weekly behavioral modification sessions
- Physical Activity
  - 100 minutes of moderate aerobic exercise per week



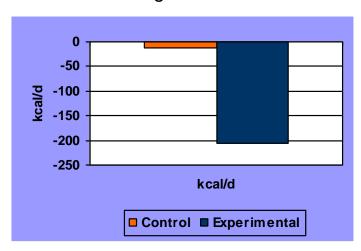


#### **Control Condition:**

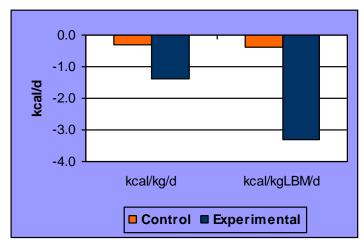
- Dietary Intake
  - Subjects were instructed to:
    - Maintain current eating behaviors
    - Maintain current body weight
- Physical Activity
  - Subjects were instructed to:
    - continue current levels of physical activity

#### Results

Change in Absolute REE



#### Change in REE Relative to Body Weight and Lean Body Mass



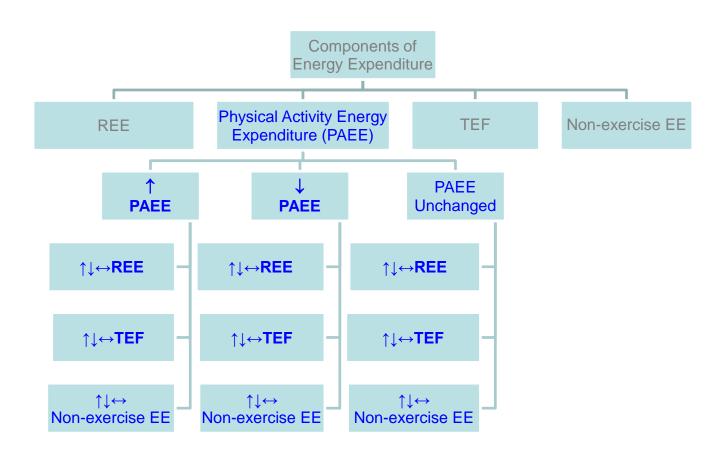




# Does Energy Expenditure Influence Energy Intake?

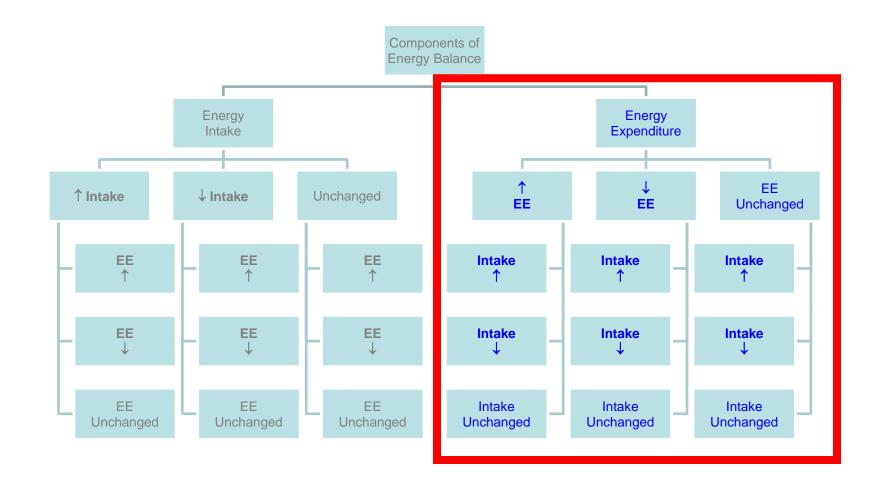








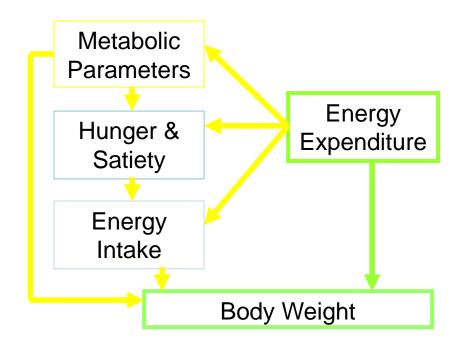








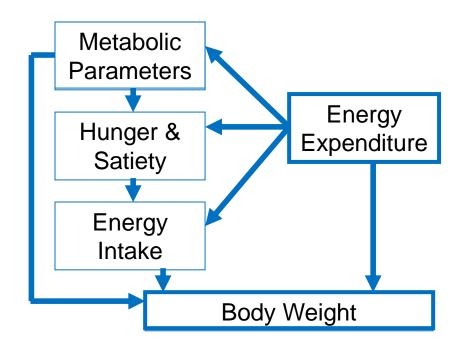
#### Potential Mechanisms through which Energy Expenditure Influences Energy Intake and Body Weight







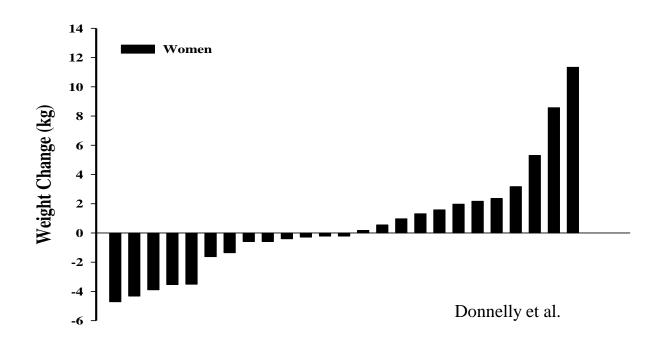
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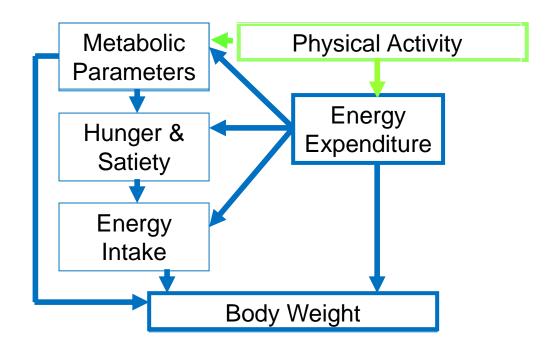
#### Mid-West Exercise Study Responders and Non-responders (Women)







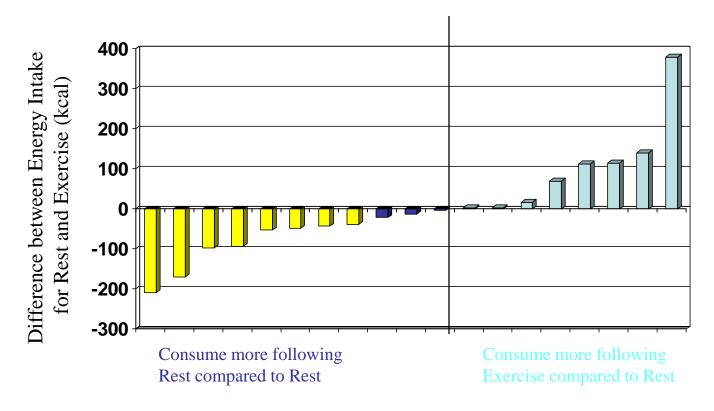
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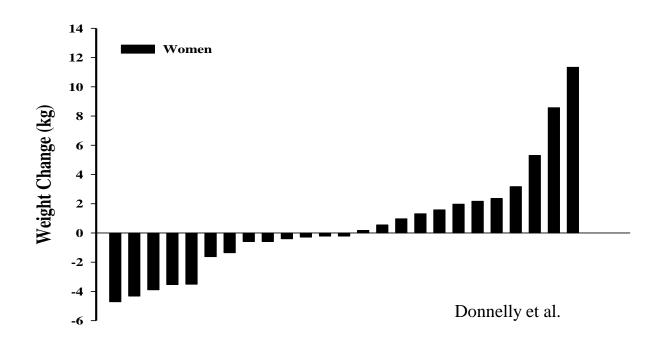
#### Difference in Individual Energy Intake Following Rest and Exercise







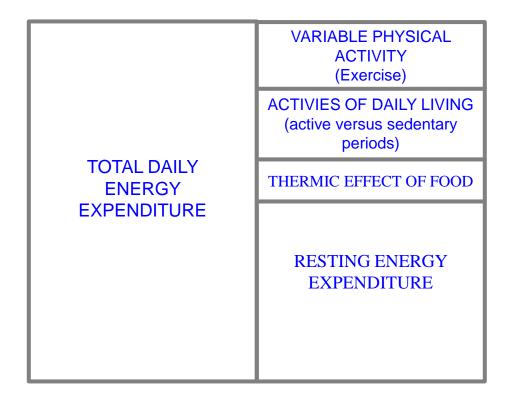
#### Mid-West Exercise Study Responders and Non-responders (Women)







#### Does One Component of Energy Expenditure Influence Other Components of Energy Expenditure?



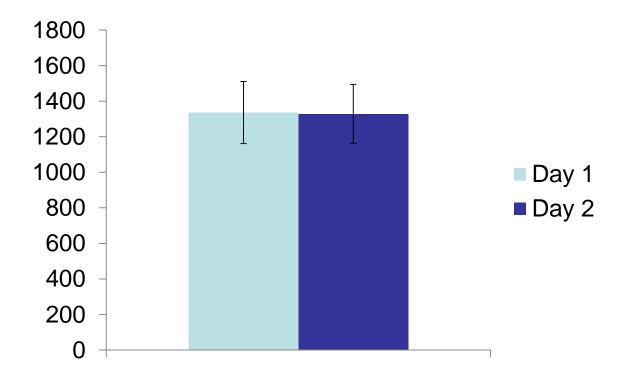


#### Is Resting Energy Expenditure Stable?





#### Daily Variability in REE



Ireland L and Jakicic JM. Unpublished





#### Does Activity Influence Resting Energy Expenditure?





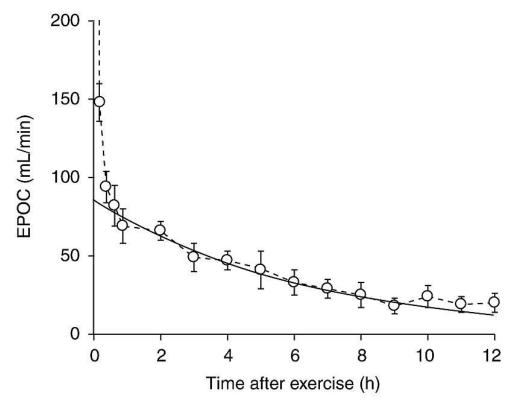
#### Excess Post-Exercise Oxygen Consumption (EPOC)

- A measure of increased rate of oxygen consumption following periods of activity
  - Most research has focused on moderate to vigorous forms of exercise
- Oxygen used in the processes to restore the body to a resting state following a period of exercise
- The **EPOC** comprises only 6-15% of the net total oxygen cost of the exercise.





Time plot of excess post-exercise oxygen consumption (EPOC) after exhaustive exercise (71-80 minutes at 69-78% of maximal oxygen uptake (n=12)

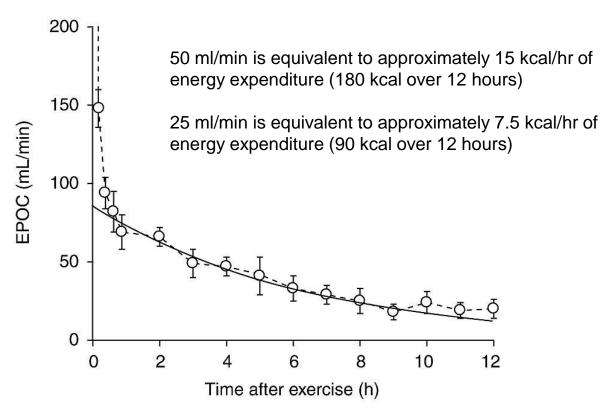


Borsheim E, et al. Sports Med. 2003, 33(14): 1037-1060.





Time plot of excess post-exercise oxygen consumption (EPOC) after exhaustive exercise (71-80 minutes at 69-78% of maximal oxygen uptake (n=12)



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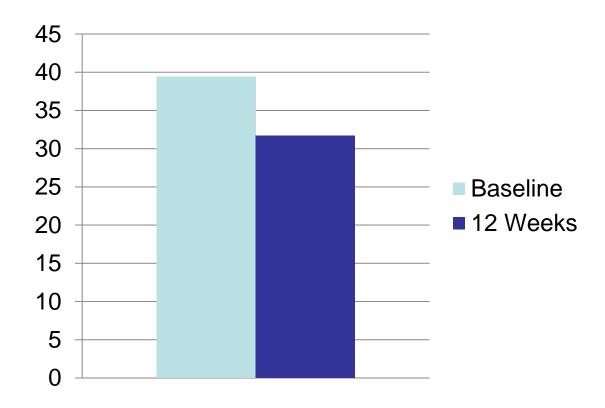


# Can the REE and/or EPOC be altered with chronic exercise training?





#### Effects of 12 weeks of aerobic training on EPOC in men



Sedlock et al. Int J Sport Nutr Exerc Metab. 2010; 20(4)): 336-349



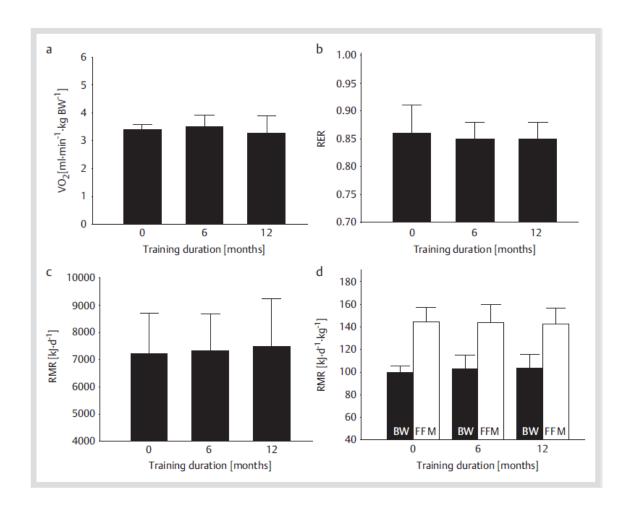


#### Effect of chronic exercise of resting energy expenditure

- 17 subjects (7 males, 10 females)
  - Age: 42±5 years
  - Weight: 74±12 kg
  - BMI: 24.6±2.2 kg/m2
- 12 months of exercise training
  - 3 days per week
  - 45 minutes per session
  - Intensity: 60% heart rate reserve (HRR)







Scharhag-Rosenberger et al. Int J Sports Med. 2010; 31: 498-504

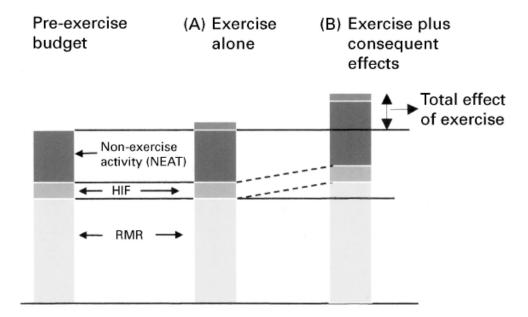




#### Does an Increase in Physical Activity Influence Total Daily Energy Expenditure?





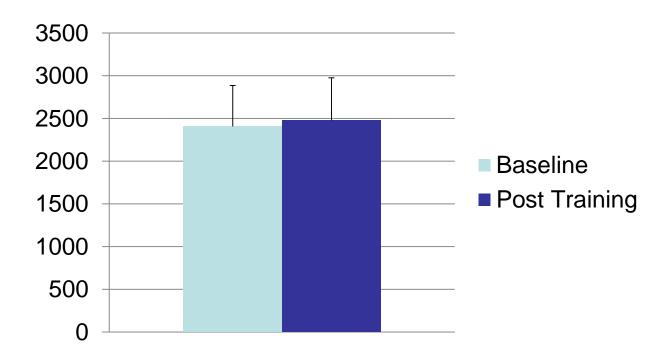


**Fig. 2.** Theoretical impacts of exercise on daily energy budgets. The effects of the exercise alone (A) are relatively small compared with the pre-exercise daily energy budget. However, exercise may stimulate increases in both the non-exercise activity thermogenesis (NEAT) and resting metabolic rate (RMR) components of the budget, with a resultant, much more marked, total effect (B).





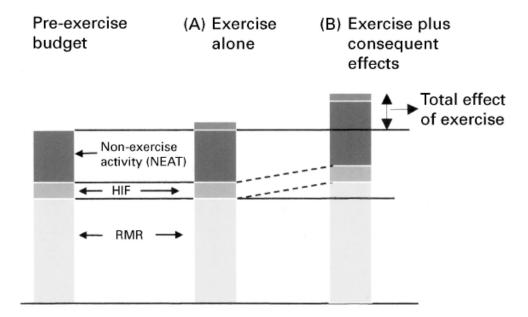
#### Effects of Endurance Training on TDEE in Elderly Persons



Goran et al. Am J Physiol. 1992; 263(5 Pt 1): E950-7



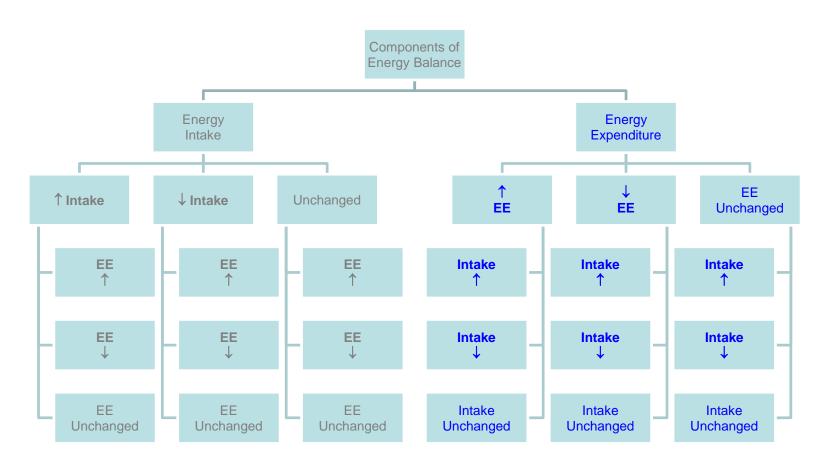




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Energy Balance is "Dynamic"











#### Got Questions?

## Please email FOODANDHEALTH@IFIC.ORG OR

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## Energy Balance Education: Preparing the Next Generation of Educators in Nutrition and Dietetics and Exercise Science

Katie Brown, Ed.D., RDN, LD
National Education Director
Academy of Nutrition and Dietetics
Foundation





The **Academy of Nutrition and Dietetics** is the world's largest organization of food and nutrition professionals. The Academy is committed to improving the public's health and advancing the profession of dietetics through research, education and advocacy.

The **Academy of Nutrition and Dietetics Foundation** is the world's largest charitable organization devoted exclusively to nutrition and dietetics.

**Vision** Optimizing health through food and nutrition. **Mission** Empowering members to be the food and nutrition leaders.

#### **RDN Practice Areas of Primary Position**

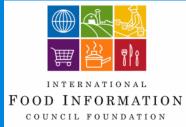
| Clinical Nutrition – acute care/inpatient | 32% |
|---|-----|
| Clinical Nutrition – ambulatory care      | 17% |
| Food & nutrition management               | 12% |
| Community Nutrition                       | 11% |
| Clinical Nutrition – long term care       | 8%  |
| Consultation and business                 | 8%  |
| Education and research                    | 6%  |
| Other                                     | 6%  |

**Academy Member Demographics** 

47% hold Master's degrees 4% hold Doctoral degrees



- 93% of physicians refer patients to RDNs
- 71% of consumers view RDNs as a "very credible" healthcare provider
- 20.4 million+ clients/patients are counseled by RDNs each year
- 30 billion media impressions garnered annually from news coverage featuring Academy Media Spokespeople





### Qualifications of a Registered Dietitian Nutritionist (RDN)

- Complete a Coordinated Program (CP) in dietetics or a Didactic Program in Dietetics (DPD) followed by a Dietetic Internship (DI) that is accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND).
  - A CP combines classroom and required 1200 hours of supervised practice experience into one program.
  - A DPD program provides only the classroom courses.
  - The DI provides at least 1200 hours of supervised practice experience.
- Pass a national examination to become credentialed as RDNs, registered dietitian nutritionists.
- Complete continuing professional educational requirements to maintain registration.





### Key points about dietetics education for registered dietitian nutritionists (RDNs)

- ACEND serves and protects students and the public by assuring the quality and continued improvement of nutrition and dietetics education programs
- ACEND establishes education standards to ensure proficiency for an entrylevel position in the work force
- Current 2012 Knowledge Requirements and Competencies do not specifically address knowledge or skills in exercise science or physical activity (PA)
- Standards for Dietetic Education Programs reviewed every five years





#### Key Points about fitness professional education

- Practitioners assess health and fitness, develop exercise prescriptions, lead exercise sessions and support clients in the behavioral aspects of healthy lifestyle maintenance.
- Commission on Accreditation of Allied Health Education Professionals (CAAHEP)
- Exercise for fitness > PA for health and prevention





### Fitness Industry Exercise Professional Certifications

- ACSM certifications that require an earned degree:
  - ACSM Certified Health Fitness Specialist bachelor's degree
  - ACSM Certified Exercise Specialist bachelor's degree
  - ACSM Registered Clinical Exercise Physiologist master's degree
- ACSM offers other best-practice certifications, which do not require a degree. These certifications are accredited by the National Commission for Certifying Agencies (NCCA).





Dynamic Energy Balance education is needed in the training of future professionals who influence the health and wellness of children in order to prevent childhood obesity and its associated chronic diseases





## #1: Integrate a multidisciplinary approach to the training of exercise science/PA professionals and RDNs in the dynamic nature of energy balance

- Integrate PA competencies into the training of the RDN
- Integrate nutrition knowledge and skills into the training of exercise science/PA professionals
- Integrate behavioral science education/strategies into the training of both





## #2 Develop competencies for pre-K-12 school teachers and physical education teachers using the dynamic energy balance approach

- Teachers would have the knowledge and skills to help students make healthy choices
- Teachers would have the foundational knowledge to be advocates for integrating nutrition, PA and behavioral education focused on achieving a healthy body weight.





### #3 Develop core standards in both in nutrition and PA, for K-12 schools that integrate dynamic energy balance

- Cross-curriculum promotion of energy balance
- School policies should reflect a culture of wellness
- Framework for national nutrition education guidelines for elementary and secondary school children?

### Successful school-based nutrition and PA programs



www.eatright.org/foundation/energybalanceforkids/



http://www.togethercounts.com/at-school/teachers



www.fueluptoplay60.com/





## #4 Develop dynamic energy balance education and experiential learning opportunities for current health professionals

- Utilize venues like USDA Higher Education Challenge Grant programs or US Department of Education
- Production of education materials by professional organizations





### The Opportunity

Nutrition and exercise science professionals need to effectively communicate the importance of both sides of the energy balance equation











### Got Questions?

# Please email FOODANDHEALTH@IFIC.ORG OR

Join the Twitter conversation! Follow @FoodInsight and use the hashtag #FoodInsight.







# Understanding the Consumer's Knowledge of Energy Balance: Are We Connecting?

Marianne Smith Edge, MS, RD, LD, FADA Senior Vice President, Nutrition and Food Safety International Food Information Council Foundation







### IFIC Foundation Mission

 To effectively communicate science-based information on health, nutrition, and food safety for the public good.

 Primarily supported by the broad-based food, beverage and agricultural industries.

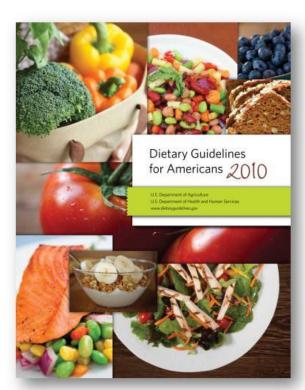
www.foodinsight.org





### 2010 DGA Key Recommendations

- Balance calories with physical activity to manage weight.
- Consume more of certain foods such as fruits, vegetables, whole grains, fat-free and low-fat dairy products, and seafood, with nutrients that often come up short.
- Consume fewer foods with sodium (salt), saturated fats, trans fats, cholesterol, added sugars, and refined grains.







### 2010 Dietary Guidelines Alliance Consumer Research

Motivating Families to Lead a Healthier Lifestyle in 2011 and Beyond

2010 Dietary Guidelines Alliance





### **KEY TAKEAWAYS**

- If achieving energy balance is the goal, getting parents to believe that calories are important is a crucial step that cannot be skipped.
- They need to understand what calories are (to a basic extent). Calories are not "good" or "bad," but paying attention to them can positively impact weight.
- It has to become easier for them to pay attention to calories. Still, calories need to be presented within the context of food and beverage choices.
- Parents understand the benefits of physical activity. In fact, most have been active at some point in their lives and have experienced the benefits firsthand. The problem is staying committed.





# Top-Performing Consumer-Tested Messages

#### Know your number.

 Learning how many calories you should consume in a day is a critical first step in managing your weight.

#### Calories count.

• Calories are like a budget – you can only eat so many in a day. Spend wisely by choosing lower-calorie, nutrient-rich foods most of the time to help manage your weight.

#### Fun stuff counts as exercise!

Get active with the family whether it's soccer in the backyard, dancing to music or taking a
walk in your neighborhood.

#### Take charge of your weight.

 Balancing the calories you eat and drink with the calories you burn through physical activity puts you in control.

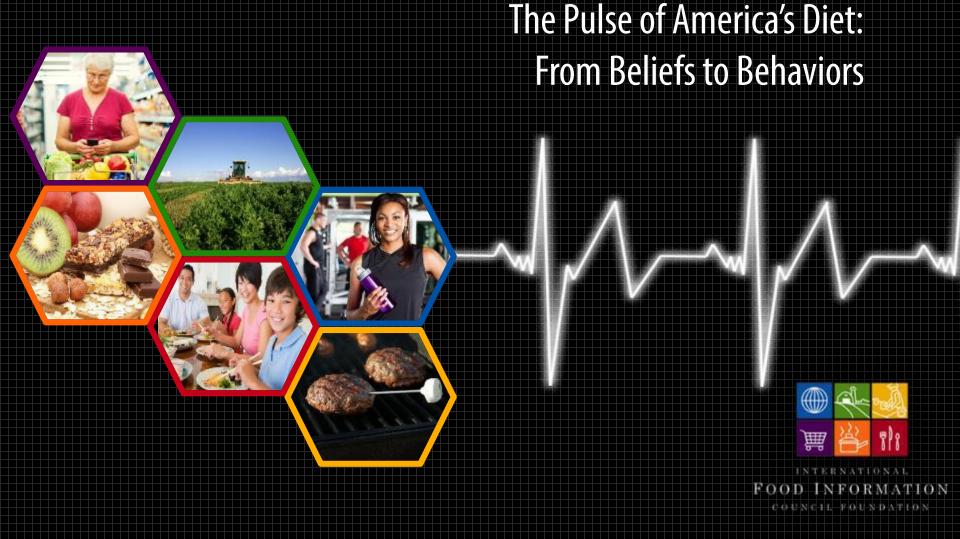
#### Small steps = big changes.

Serve smaller portions to help curb calories and keep your weight on the right track.

#### Base your plate on nutrient-rich foods that offer beneficial nutrients and fewer calories.

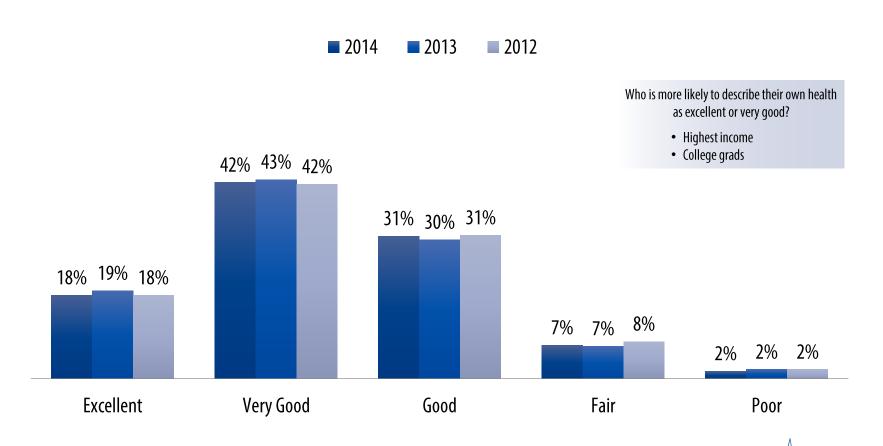
 Choose fruits and vegetables, whole and enriched grains, lean meats, beans and nuts, and low-fat and fat-free dairy foods more often.

## 2014 FOOD & HEALTH SURVEY



# Consistent with previous years, nine out of ten Americans describe themselves as being (excellent/very good/good) healthy.

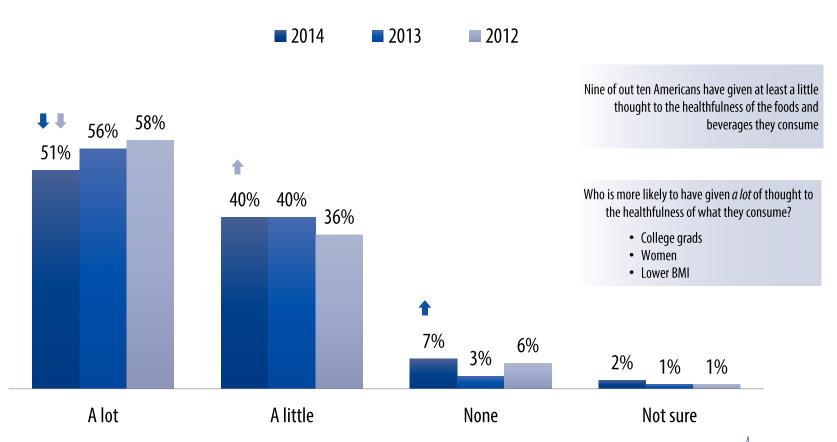
How would you describe your own health in general?



2014 n=1,005; 2013 n=1,006; 2012 n=1,057

# In 2014, half of all Americans have given *a lot* of thought to the healthfulness of foods and beverages they consume.

Over the past year, how much thought have you given to the healthfulness of the foods and beverages you consume?

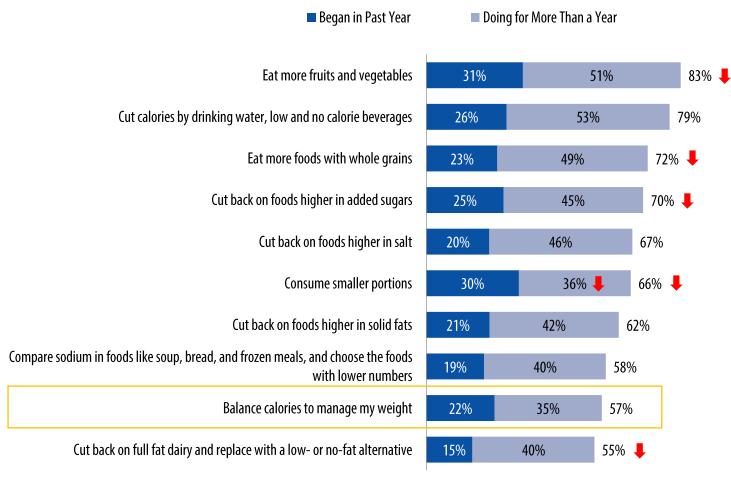


2014 n=1,005; 2013 n=1,006; 2012 n=1,057

Arrows indicate significant (.95 level) differences vs. prior year(s); color of arrow indicates comparison year.

# More than four out of five Americans have made an effort to eat more fruits and vegetables. The least popular action is to cut back on full fat dairy.

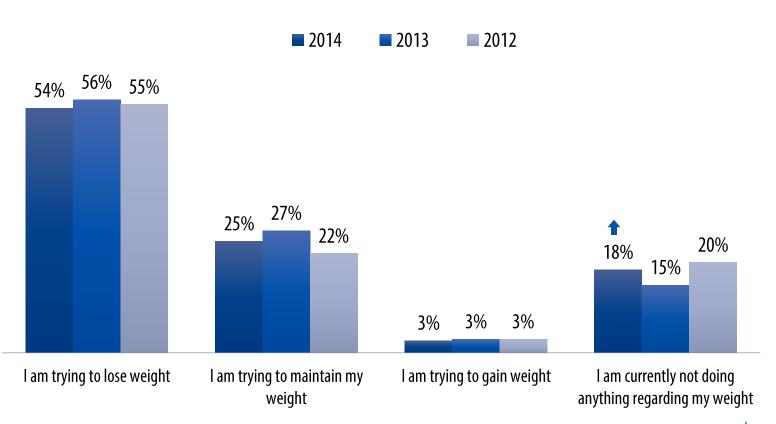
Over the past year, which of the following, if any, have you made an effort to do?



2014 n=1,005; Arrows indicate significant (.95 level) differences vs. 2013.

# Four out of five Americans are trying to lose weight or maintain their current weight. One in five are not doing anything for their weight.

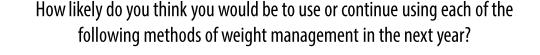
Which of the following best describes what you are currently doing regarding your weight?



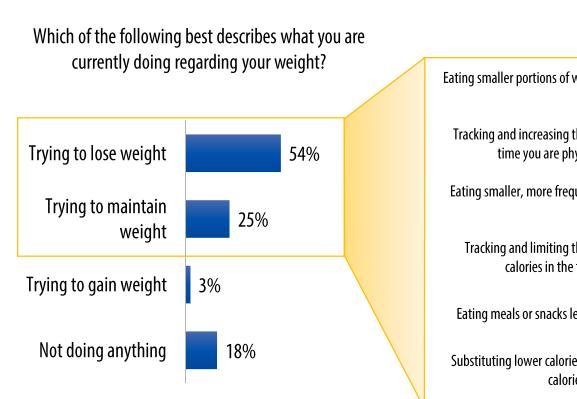
2014 n=1,005; 2013 n=1,006; 2012 n=1,057

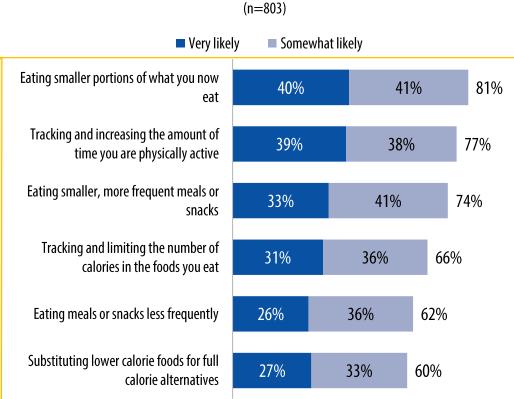
Arrows indicate significant (.95 level) differences vs. prior year(s); color of arrow indicates comparison year.

The majority of Americans report trying to lose or maintain weight. When asked what methods they will use for weight management, four out of five say they would eat smaller portions, and three-quarters would track and increase their physical activity.



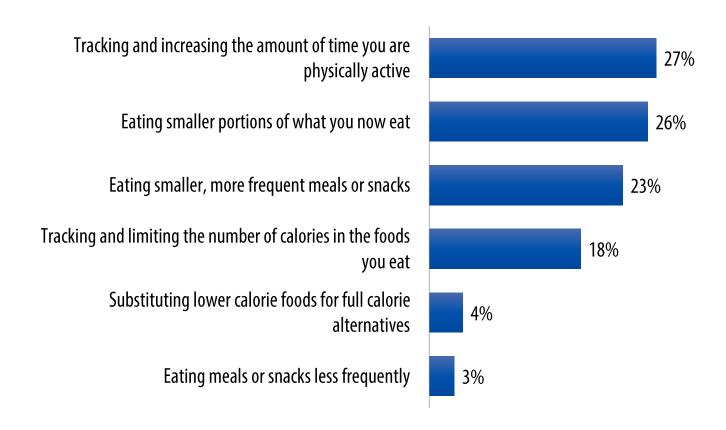
Trying to Lose or Maintain Weight 2014





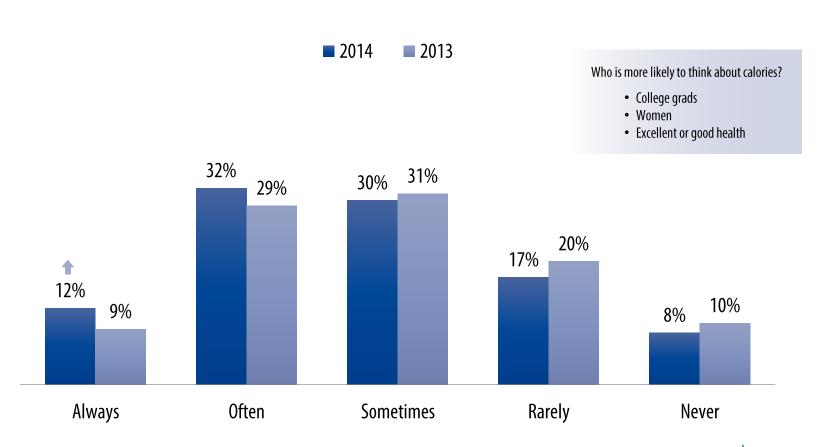
## Consumers in general think that tracking and increasing physical activity and eating smaller portions are the most effective weight management strategies for the average person.

In general, which ONE of the following weight management strategies do you believe is the MOST effective for the average person?



# Slightly more than two out of five Americans think about calories often or always, while a quarter of Americans think about calories rarely or never.

How often do you think about the number of calories you consume?

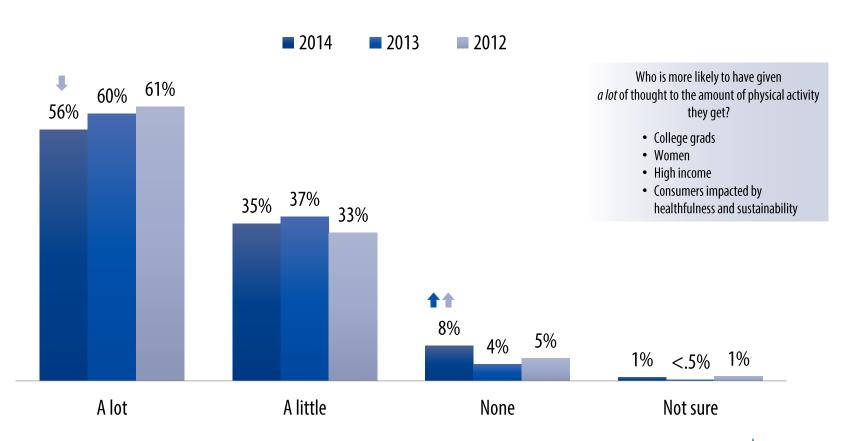


2014 n=1.005; 2013 n=1.006

Arrows indicate significant (.95 level) differences vs. 2013.

More than half of all Americans have given *a lot* of thought to the amount of physical activity they get. Compared to 2013, twice as many say they have not thought about physical activity at all in 2014.

Over the past year, how much thought have you given to the <u>amount of physical activity</u> you get?



2014 n=1,005; 2013 n=1,006; 2012 n=1,057

Arrows indicate significant (.95 level) differences vs. prior year(s); color of arrow indicates comparison year.

### HEALTH AND DIET

## Roughly one in four Americans meet U.S. Department of Health and Human Services' physical activity guidelines.

#### **Percentages Meeting HHS Physical Activity Guidelines**

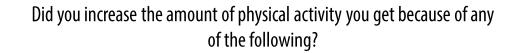
All except outliers (n=1,053)

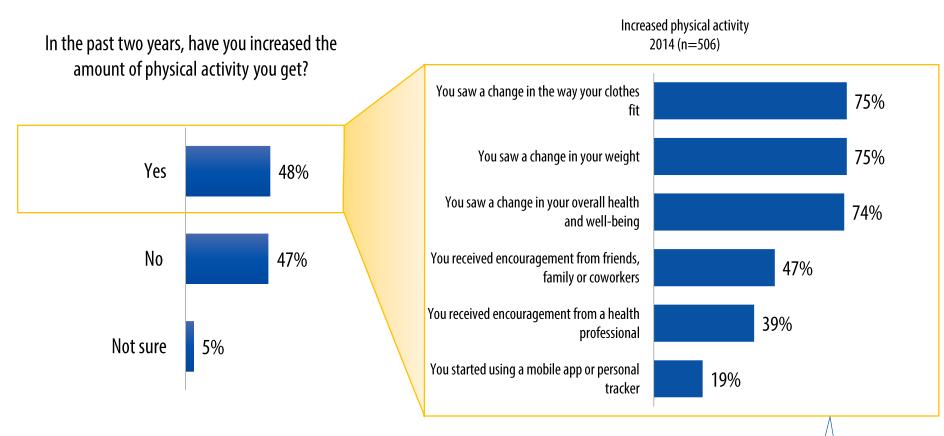
| Meets HHS Guidelines (net)          | 23%       |
|-------------------------------------|-----------|
| Moderately active Vigorously active | 14%<br>8% |
| Does Not Meet HHS Guidelines (net)  | 77%       |
| Sedentary                           | 34%       |
| Moderately active                   | 40%       |
|                                     |           |

To meet the Department of Health and Human Services' 2008 physical activity guidelines:

If moderately active: 150 or more minutes per week, with strength training at least two times per week If vigorously active: 75 or more minutes per week, with strength training at least two times per week Analysis excludes outliers with less than 1 minute or more than 500 minutes of activity per active day.

Almost half of Americans have increased their physical activity in the past two years. Among those who did increase activity, the most reported reasons include seeing a change in the way clothes fit, a change in weight, and a change in health.

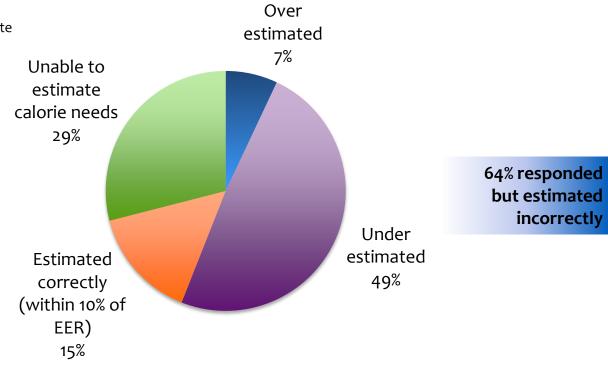




#### The vast majority of Americans do not know how to correctly estimate daily calorie needs.

#### How Close Estimates of Daily Calorie Needs Compare to **EER—Estimated Energy Requirements**

Provided age, weight, height and excluding outliers for calorie estimate (n=997)



#### Formulas used for EER:

Men: 662 - ((9.53 \* age) + PA \* (15.91 \* weight in kilos + 539.6 \* height in meters)). PA (physical activity) =1.00 for sedentary, 1.11 moderate, 1.25 vigorous. Women: 354 - ((6.91 \* age) + PA \* (9.36 \* weight in kilos + 726 \* height in meters)). PA (physical activity) =1.00 for sedentary, 1.12 moderate, 1.27 vigorous. Analysis excludes outliers estimating they need fewer than 500 calories per day to maintain their weight.

## Many Americans are unsure about how many calories they consume and burn.

As far as you know, how many calories should you consume per day to maintain your current weight, given your age, height, and physical activity?

On average, how many calories do you think you "burn"/use per day?

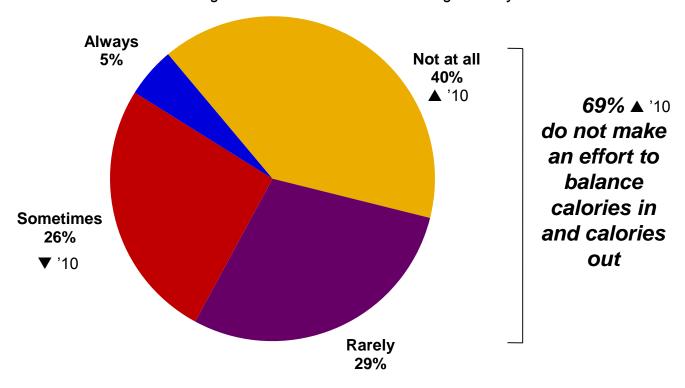
|                | Consumed<br>(n=1,039) | Burned<br>(n=960) |
|----------------|-----------------------|-------------------|
| 1,000 or less  | 3%                    | 19%               |
| 1,001 to 1,500 | 26%                   | 10%               |
| 1,501 to 2,000 | 27%                   | 11%               |
| 2,001 to 2,500 | 9%                    | 6%                |
| 2,501 or more  | 5%                    | 3%                |
| Average        | 1,788                 | 1,500             |
| Unsure         | 30%                   | 52%               |

Analysis excludes outliers (below 500 calories or greater than 5,000).



# Daily Effort to Balance Calories Consumed and Burned

A majority of Americans make no attempt to consciously monitor the balance of calories they consume and expend in a day. The number of Americans doing this "not at all" has increased significantly since 2010.



To what extent, if at all, do you make a conscious effort to monitor the balance between how many calories you consume and how many calories you "burn"/use per day?\* [Select one] (n=1000)

\*Question added in 2010.

▲ / ▼ Significant increase/decrease from year indicated

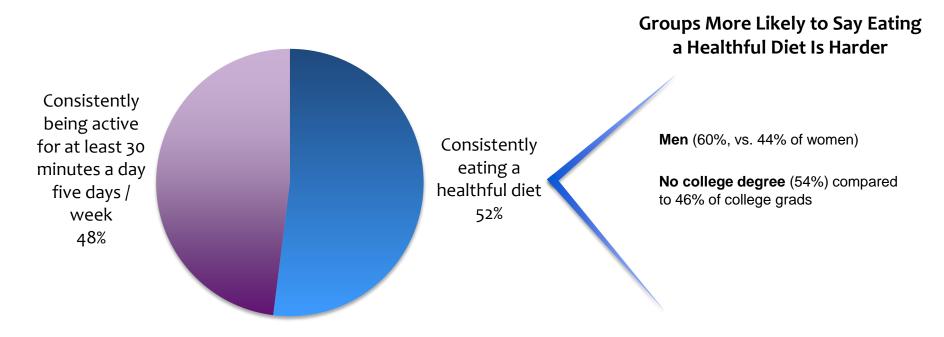
### HEALTH AND DIET

## Americans are evenly split in whether they believe it is more difficult to consistently eat well or exercise.

Men are far more likely to be challenged by consistently eating healthfully (60%) than remaining active (40%). The opposite is true for women (44%, 56%).

#### Which do you think is harder to do well?









# Energy Balance at a Crossroads: Call to Action

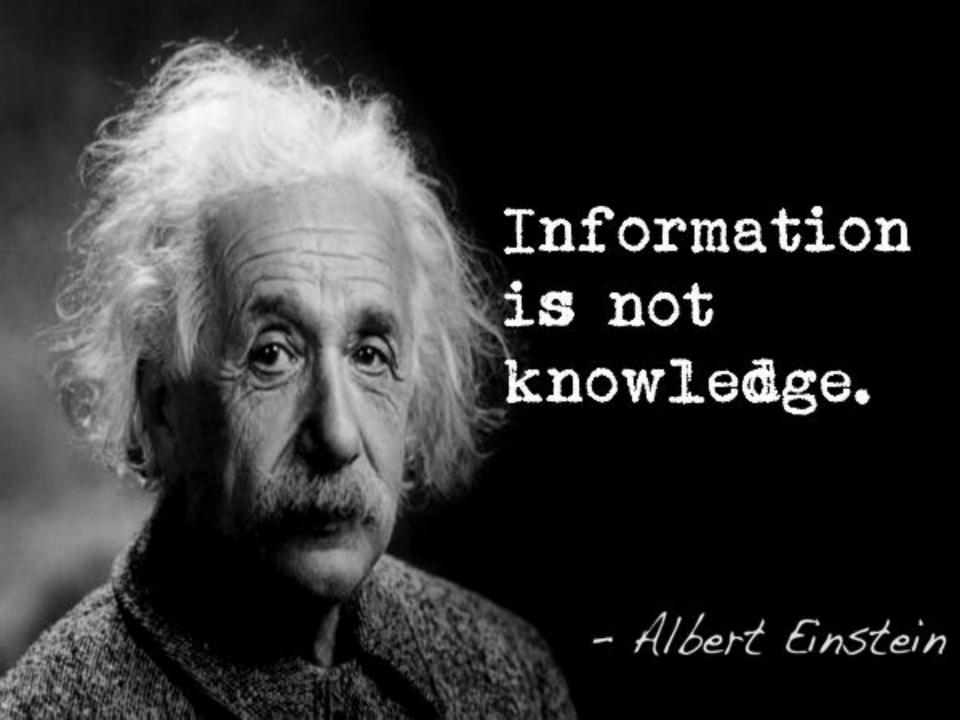
Make Energy Balance Messages relevant and realistic to the specific populations and communities





# Energy Balance at a Crossroads Recommendations

- 1) Communicate energy balance messages that are tested and relevant to the intended audience.
- 2) Develop consistent messages across the spectrum of audiences.
- 3) Create partnerships for delivery of message and practice of energy balance.
- 4) Map integrated nutrition and physical activity programs currently being provided.







### Call to action

Nutrition and exercise science professionals need to:

- Effectively communicate the importance of both sides of the energy balance equation and its dynamic nature.
- Emphasize both energy intake and expenditure and their effect one has upon the other.











### Got Questions?

# Please email FOODANDHEALTH@IFIC.ORG OR

Join the Twitter conversation! Follow @FoodInsight and use the hashtag #FoodInsight.







## Following The Webcast

- To access more information on the Energy Balance at a Crossroads Expert Panel, please visit:
  - Journal of the Academy of Nutrition and Dietetics 2014;114 (7) 113-9
  - Medicine & Science in Sports & Exercise 2014; 46(7); 1466-73
- Reminder: Participants of this live-event webcast who are Registered Dietitians or Dietetic Technicians, Registered are eligible for 1.0 Continuing Education Units from the Academy of Nutrition and Dietetics.
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  - An email will be sent one hour after the completion of this webcast with a link to download the certificates. CPEU is only available for those pre-registered for the live webcast today.





### Thank You!