The Obesity Epidemic
What the Clinician Needs to Know
NLA workshop – 5/22/16 New Orleans

JOYCE L ROSS, MSN, CRNP, CLA, FNLA, FPCNA, MODERATOR

DISTINGUISHED PANEL

LYNNE BRAUN, PHD, CNP, CLS, FNLA, FAHA, FPCNA, FAAN
LORI ALEXANDER, MSHS, RD, CLS, FNLA
RALPH LA FORGE, MS, CLS, FNLA
Disclosures

• **Speakers Bureau**
  - KOWA, AstraZeneca, Abbvie, Amgen, Sanofi/Regeneron, Amarin

• **Advisory Board:**
  - Amarin
Obesity

- Chronic, relapsing disease characterized by an excessive accumulation of body fat
- It is heterogeneous
  - Genetic
  - Environmental
  - Metabolic
  - Behavioral
- Associated with multiple risk factors that lead to morbidity and mortality
- American Heart Association has classified obesity as a major, modifiable risk factor for CAD
Overweight and Obesity: Basic Concepts

- Practical problem
  - Obesity can be treated, but almost always recurs

- Emerging paradigm
  - Obesity is an incurable chronic disease requiring lifelong palliation
More Than 50% of US Adults are overweight or Obese

- Has been increasing over time at an epidemic proportion
  - 1962 = 43.3% population of > 20 years old
  - 1974 = 46.1%
  - 1980 = 46.0%
  - 1994 = 54.9%

- Resulting in one of the most pervasive public health problems in the country
Obesity Trends Among U.S. Adults, BRFSS
(*BMI ≥30, or about 30 lbs. overweight for 5’4” person)
Genetic Predisposition

Energy Intake
Hi fat, High-caloric diet

Energy Expenditure
Sedentary lifestyle

Too Much In, Not Enough Out

Genetic Predisposition
The Evolution of Man (and Woman)

*The Economist*, December 13th-19th 2003
Potential Factors Contributing to Obesity

Evolutionary
- Early ancestors had to adapt to caloric scarcity
- Women with a more active metabolism lost fat reserves in times of caloric scarcity and were unable to procreate

Current Environmental Factors
- Marketing of high caloric density food items
- Cycle of stress, eating and reward
- Low cost of high caloric density compared to low caloric density foods
- Possible epigenetic phenomenon or endocrine disrupters
“I have metal fillings in my teeth. My refrigerator magnets keep pulling me into the kitchen. That’s why I can’t lose weight!”
Discrimination: The Pain of Obesity

Former severely obese patients

100% preferred to be deaf, dyslexic, diabetic or have heart disease or bad acne than to be obese again

Leg amputation was preferred by 91.5% and blindness by 89.4%

100% preferred to be a normal weight person rather than a severely obese multimillionaire

Medical Complications of Obesity

Pulmonary disease
- Obstructive sleep apnea
- Abnormal function
- Hypoventilation syndrome

Nonalcoholic fatty liver disease
- Steatosis
- Steatohepatitis
- Cirrhosis

Gall bladder disease

Reproductive abnormalities
- Abnormal menses
- Infertility
- Polycystic ovarian syndrome
- Male hypoandrogen/hyperestrogen

Osteoarthritis

Gout

Phlebitis, deep vein thrombosis
- Venous stasis

Coronary heart disease (CHD)

Diabetes

Dyslipidemia

Hypertension

Severe pancreatitis

Cancer
- Breast, colon, prostate, uterus, cervix, esophagus, pancreas, kidney

Obesity and Abdominal Adiposity Are Leading Drivers of Cardiometabolic Risk

Body size
↑ Body mass index
↑ Abdominal adiposity

Insulin resistance

Glucose metabolism
↑ PP glucose
↓ IFG
IGT
T2DM

Uric acid metabolism
↓ Uric acid
↓ Urinary uric acid clearance

Dyslipidemia
↑ TG
↑ PP lipemia
↓ HDL-C
Small, dense LDL

Hemodynamic
↑ SNS activity
↑ Na retention
Hypertension

Inflammation/Thrombosis
↑ CRP
↑ PAI-1
↑ Fibrinogen

CORONARY HEART DISEASE

PP=postprandial, IFG=impaired fasting glucose, IGT=impaired glucose tolerance, T2DM=type 2 diabetes mellitus, TG=triglycerides, PP lipemia= Post-prandial lipemia, HDL-C=high-density lipoprotein cholesterol, LDL=low-density lipoprotein, SNS=sympathetic nervous system, Na=sodium, CRP=c-reactive protein, PAI-1=plasminogen activator inhibitor

Reaven GM. *Diabetes*. 1988;37:1595-1607;
The Metabolic Syndrome Is A Metabolic Time Bomb

With the elevated risk of diabetes and cardiovascular disease from the metabolic syndrome, there is an urgent need for strategies to defuse this metabolic time bomb.
# Risk Reduction Therapy

<table>
<thead>
<tr>
<th>Risk Behavior</th>
<th>% Mortality – 10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke Cessation</td>
<td>35 – 45 %</td>
</tr>
<tr>
<td>LDL Reduction to goal</td>
<td>25 – 35 %</td>
</tr>
<tr>
<td>BP management to goal</td>
<td>10 – 15 %</td>
</tr>
<tr>
<td>ASA</td>
<td>10 %</td>
</tr>
<tr>
<td>ACE Inhibitor Use</td>
<td>20 – 30 %</td>
</tr>
<tr>
<td>Weight Loss</td>
<td>20 %</td>
</tr>
<tr>
<td>Exercise</td>
<td>20 %</td>
</tr>
</tbody>
</table>

Grundy 9/2000
Therapeutic Lifestyle Interventions

- **Weight reduction**
  - enhances LDL-C lowering
  - reduces metabolic syndrome risk factors

- **Increased physical activity**
  - reduces VLDL levels, raises HDL-C, lowers LDL-C levels
  - lowers blood pressure
  - reduces insulin resistance

- **Dietary carbohydrate restrictions**
  - periodic assessments of dietary changes

Metabolic Syndrome and Subclinical Atherosclerosis
Therapeutic Lifestyle Changes in LDL-Lowering Therapy

Major Features

- TLC Diet
  - Reduced intake of cholesterol-raising nutrients (same as previous Step II Diet)
    - Saturated fats <7% of total calories
    - Dietary cholesterol <200 mg per day
  - LDL-lowering therapeutic options
    - Plant stanols/sterols (2 g per day)
    - Viscous (soluble) fiber (10–25 g per day)
- Weight reduction
- Increased physical activity

Adapted from NCEP ATP III. JAMA. 2001;285:2486-2497
A 53-year-old male accountant is referred by his new CPA practice for an initial executive exam.

Patient has dyslipidemia and history of “borderline” hypertension; comorbidities include erectile dysfunction, chronic fatigue, and depression.

Family history of father with MI at age 50.

Meds; Paroxetine (SSRI)10 mg qd.

Current weight of 236 pounds, is his highest: Ht. 5’ 10” (BMI 34). Waist circ 40 “ BP 148/92.

Reports excessive snoring at night, per spouse:
- Experiences morning headaches and daytime somnolence.
"I already diagnosed myself on the Internet. I’m only here for a second opinion."
Case Study
Laboratory Results

- **Glucose**: 102 mg/dL
- **TC**: 204 mg/dL
- **HDL-C**: 36 mg/dL
- **LDL-C**: 100 mg/dL
- **TG**: 340 mg/dL
- **Non-HDL-C**: 168 mg/dL
- **EKG**: sinus bradycardia, rate 56
- **A1C**: 6.3%
- **Creatinine**: 1.2 mg/dL
- **AST**: 27 U/L
- **ALT**: 53 U/L

TC = total cholesterol, EKG = electrocardiogram, Non-HDL-C = Non high-density lipoprotein cholesterol, A1c = hemoglobin A1C, AST = aspartate aminotransferase, ALT = alanine aminotransferase
### Case Study

**Patient Characteristics**

Meeting Metabolic Syndrome Criteria

- **Waist:** 40 inches
- **TG:** 340 mg/dL
- **HDL-C:** 36 mg/dL
- **Blood pressure:** 148/92 mm Hg
- **Glucose:** 102 mg/dL
Case Study
Additional Tests

- BP monitoring shows early AM systolic as high as 160, and consistent diastolic > 90 during the day
- Sleep study shows significant number of apnea spells with critical desaturation
- \textbf{Lp(a)}: 10 mg/dL
- \textbf{apo B}: 110 mg/dL

Lp(a)= Lipoprotein(a)
Case Study
Treatment Plan

- Start statin to reduce LDL-C, non HDL-C and apo B
- Recommend individual dietitian consult for weight reduction
- Follow up with obtaining CPAP machine fitting/ settings
- Home BP monitoring

CPAP= Continuous positive airway pressure
Non HDL-C=non HDL cholesterol
Effecting Change

Change Agents

- Educative process
  - The past does not equal the future
    - The process of pain and pleasure
    - What do changes mean to the patient
    - Setting reachable goals
    - Partnering for progress
  - Contracts
  - Support

Change the attitude = Change in behavior

Ross J 2004
Involve the patient

Provider-centered approach may lead to missed diagnoses and poor adherence

Patient-centered approach facilitates identification of risk conditions

Enhanced communication improves patient adherence, outcomes, and satisfaction

Integrative medicine framework

Multidimensional, patient-centered, individualized

- Mind-body approaches
- Physical activity
- Nutrition
- Health self-education
- Group sessions
- Individual sessions

Improved health behaviors

WHAT MAKES OUR PATIENTS TICK? WHAT DO WE DO ABOUT IT
Strategies for Implementing Behavior Change

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Disclosures

- UpToDate: author, advisory board
- Practice Point: speaker
Objectives

- Discuss selected behavior change theories as they relate to weight loss and obesity management.
- Identify cognitive behavioral strategies for promoting behavior change.
- Describe several types of food-related triggers; identify stimulus-control strategies for dealing with triggers.
Causes of Obesity

Lifestyle

Environment

Genetics
Social Cognitive Theory of Behavior Change
Social Cognitive Theory
(Bandura, 1960s)

Observational learning / modelling
Self-efficacy
Goals
Outcome expectancies

Behavior change

Long term change
Internal reinforcement
External reinforcement
Relapse
Falling back into old patterns, actions and behaviours. Each relapse is met with new insights and knowledge leading to less frequency in setbacks.

Pre-Contemplation
Not thinking about or has rejected change.
Living in Harms Way

Contemplation
Thinking and talking about change. Seeks out support.
Tired of Living in Harms Way

Maintenance
Achieving positive and concrete developments with continuing and potentially little support.
Living Out Of Harms Way

Action
Taking positive steps by putting the plan into practice.
Gradually Moving Out of Harms Way

Planning
Planning what it would take to make change happen.
Strategizing How to Move Out of Harms Way

Adapted from Prochaska & DiClemente and Ignacio Pacheco | YOUCAN 2012
<table>
<thead>
<tr>
<th>Stage of Change</th>
<th>Barriers</th>
<th>Goal of Counseling</th>
<th>Techniques to Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Contemplation (not ready to change diet and physical activity behaviors to lose weight)</td>
<td>Not important to patient Low confidence Denial Defensiveness Lack of awareness</td>
<td>Advise and encourage contemplation</td>
<td>Express empathy Develop discrepancy Listen reflectively Examine the pros and cons of change, summarize Provide information if needed Acknowledge decision Offer help when ready</td>
</tr>
<tr>
<td>Contemplation (thinking about changing diet and physical activity behaviors to lose weight)</td>
<td>Low confidence Procrastination Low social or environmental support Competing demands</td>
<td>Explore ambivalence and shift towards making a decision to change</td>
<td>Express empathy Develop discrepancy Acknowledge ambivalence Listen reflectively Examine pros and cons of change, summarize Provide information if needed Affirm positive statements Reinforce partnership and willingness to help</td>
</tr>
<tr>
<td>Preparation (getting ready to change diet and physical activity behaviors to lose weight)</td>
<td>Confidence may still be low Unsure of specific actions</td>
<td>Strengthen commitment, plan specific actions</td>
<td>Provide information and discuss options Provide assistance with selected actions Express confidence in patient Affirm positive statements Reinforce partnership and willingness to help</td>
</tr>
<tr>
<td>Action (has begun changes in diet and physical activity behaviors)</td>
<td>Some obstacles persist Confidence may still be low At risk for relapse</td>
<td>Praise and reinforce, plan for contingencies</td>
<td>Provide frequent positive affirmation Provide ongoing assistance with barriers Express confidence in ability to maintain the change</td>
</tr>
<tr>
<td>Maintenance (successfully maintained new behaviors for at least 6 months)</td>
<td>At risk for relapse</td>
<td>Praise and reinforce, plan for contingencies</td>
<td>Provide frequent positive affirmation Provide ongoing assistance with barriers Express confidence in ability to maintain the change</td>
</tr>
</tbody>
</table>
Self-Determination Theory (SDT)
(Ryan & Deci, 2000)

Fosters
- Autonomy
- Competence
- Relatedness

Experience of
- Volition
- Motivation
- Engagement

Result in
- Enhanced performance
- Persistence
- Creativity
Types of Motivation: Self Determination Theory

More likely to engage in and sustain behavior change

<table>
<thead>
<tr>
<th>Amotivated</th>
<th>External</th>
<th>Introjected</th>
<th>Identified</th>
<th>Integrated</th>
<th>Intrinsic</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am not motivated</td>
<td>My employer/doctor/coach told me I need to</td>
<td>I know I should</td>
<td>The behavior is consistent with my goals</td>
<td>The behavior is part of my identity</td>
<td>The behavior feels good</td>
</tr>
</tbody>
</table>

Controlled

Autonomous

Adapted from Segar & Hall (2011)  Amy Bucher, Ph.D. (amy.bucher@gmail.com)  Source: Ryan & Deci (2000)
Interventions to Promote Physical Activity and Dietary Lifestyle Changes for Cardiovascular Risk Factor Reduction in Adults: A Scientific Statement From the American Heart Association


Circulation 2010, 122:406-441: originally published online July 12, 2010
doi: 10.1161/CIR.0b013e3181e8edf1
Cognitive Behavioral Strategies for Promoting Behavior Change

- Goals that focus on behavior (increasing whole grain intake or daily PA)
  - Providing regular feedback on goal attainment
- Self-monitoring (3-day food records, charting weight, steps, minutes of PA)
  - May be combined with Internet programs for monitoring dietary intake and PA
- Frequent contact with patients
  - Face-to-face, telephone, email, group-based interventions
  - Regular contact is important
- Healthcare provider feedback (illuminates consequences of dietary/PA behavior for an individual; provides motivation to continue behavior)
- Self-efficacy enhancement
  - Substituting fruit for a high-calorie dessert; watching someone prepare a healthy meal; feeling less short of breath with weight loss
Cognitive Behavioral Strategies for Promoting Behavior Change

- **Incentives**
  - Rewards by employers

- **Modeling**
  - Observing other individuals performing desired behaviors (in-person or video cooking demos, exercising with a partner)
  - Have person speak to someone who has made successful behavior changes

- **Problem-solving**
  - Useful for navigating barriers to behavior change, e.g., negotiating family support for dietary change or incorporating PA as a family event
  - Individual should brainstorm solutions

- **Relapse prevention**
  - Recognize situations that place individuals at risk for lapses from dietary or PA behavior change (vacations, holidays)
5 A’s Behavior Change Model

• **Assess**
  - Current dietary/PA pattern
  - Knowledge about risk factors
  - Most challenging barriers to eating healthy and exercising
  - Conviction and confidence about target behaviors
Advise

- Provide patient-specific recommendations for behavior change
- Relate lab results/risk factors to the need for behavior change
- Inform patient that making dietary changes and engaging in regular PA are as important as taking a medication
- Provide specific, documented behavior change advice
• Use shared decision-making strategies that include collaborative goal setting
• Have patient develop specific, measurable, doable goal(s)
• Provide options and choices among possible nutrition- and PA-related goals
Assist

- Offer strategies that include action planning and problem solving
  - Address barriers to change
  - Stress-eating, cravings, long work hours, no time for breakfast, no time for exercise, eating at your desk, too much fast food, frequent business dinners, “drinking” too many calories, higher cost of fresh/good food, safety in neighborhoods, etc.
• Follow up on action plans
• Make and follow up on referrals
• Give patient a copy of the action plan
• Email communication (?) for follow up and questions
• Review action plan and progress during next appointment (be sure it’s documented – note, patient’s AVS)
Cognitive Behavioral Strategies for Promoting Behavior Change

Motivational Interviewing
Motivational Interviewing

- Patient-centered approach to counseling for behavior change emphasizing:
  - Individual autonomy
  - Collaboration between patient and provider
- Non-confrontational
- Patient is expert
- Helps patient to address ambivalence
- Reinforces change talk
Coping Skills Training

- Recognize Hooks

- Stress Management
  - Deep Breathing
  - Progressive Muscle Relaxation
  - Mindfulness

- Assertive Communication

- Cognitive Restructuring/ Reframing

- Problem Solving
## Stimulus Control

<table>
<thead>
<tr>
<th>Triggers</th>
<th>Goals</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental</strong></td>
<td>• Reducing exposure to triggers and modifying reaction to them.</td>
<td>• Avoid whenever possible, remove trigger foods from your home and work</td>
</tr>
<tr>
<td>• Seeing Food</td>
<td></td>
<td>environment (out-of-sight = out-of-mind).</td>
</tr>
<tr>
<td>• Smelling Food</td>
<td></td>
<td>• Ask family or friends to keep treats out of sight.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reduce distractions (more satisfaction, less chance of overeating).</td>
</tr>
<tr>
<td><strong>Emotional</strong></td>
<td>• Learn to deal with your emotions in a productive way.</td>
<td>• Label emotions to increase your awareness of what you are feeling.</td>
</tr>
<tr>
<td>• Sadness</td>
<td></td>
<td>• Learn to accept and tolerate some unpleasant feelings.</td>
</tr>
<tr>
<td>• Anger</td>
<td></td>
<td>• Identify specific thoughts contributing to negative emotions and</td>
</tr>
<tr>
<td>• Anxiety</td>
<td></td>
<td>restructure them (i.e., change them into more helpful ways of thinking).</td>
</tr>
<tr>
<td>• Boredom</td>
<td></td>
<td>• Learn effective coping strategies (e.g., listening to music, taking a</td>
</tr>
<tr>
<td>• Frustration</td>
<td></td>
<td>walk, getting a massage, watching a movie, spending time with a friend)</td>
</tr>
<tr>
<td>• Stress</td>
<td></td>
<td>• Increase involvement in reinforcing activities (i.e., activities that</td>
</tr>
<tr>
<td>• Happiness</td>
<td></td>
<td>bring you joy and satisfaction).</td>
</tr>
<tr>
<td><strong>Social</strong></td>
<td>• Learn how social contexts affect your eating habits.</td>
<td>• Practice being assertive and saying “no” when others offer you food.</td>
</tr>
<tr>
<td>• People who urge you to eat</td>
<td></td>
<td>• Order carefully and eat slowly when dining with a group.</td>
</tr>
<tr>
<td>• Situations in which you want to eat like everyone else</td>
<td>• Learn to cope with feelings of unfairness or deprivation.</td>
<td>• Shift your focus from feelings of deprivation to feelings of pride for</td>
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<tr>
<td></td>
<td></td>
<td>having made a healthy decision.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ask your friends and family for their support/assistance.</td>
</tr>
<tr>
<td><strong>Mental</strong></td>
<td>• Learn to think differently about food.</td>
<td>• Utilize thought stopping techniques (imagine a big red stop sign and don’t</td>
</tr>
<tr>
<td>• Thinking about food</td>
<td></td>
<td>allow yourself to go continue with that train of thought).</td>
</tr>
<tr>
<td>• Reading a description of food</td>
<td></td>
<td>• Utilize distraction techniques.</td>
</tr>
<tr>
<td>• Imagining eating food in the future</td>
<td></td>
<td>• Alternately, use acceptance strategies, e.g., “I wish I could have bacon</td>
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<tr>
<td></td>
<td></td>
<td>every morning, but it’s not good for my heart. It’s disappointing, but I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>need to make some changes.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Learn how to restructure unhelpful thoughts.</td>
</tr>
<tr>
<td><strong>Biological</strong></td>
<td>• Increase awareness of the mind-body connection.</td>
<td>• Know the difference between tired, thirsty, and hungry.</td>
</tr>
<tr>
<td>• Hunger</td>
<td></td>
<td>• Recognize that hunger is not an emergency.</td>
</tr>
<tr>
<td>• Thirst</td>
<td></td>
<td>• Learn to differentiate between hunger and cravings and how to manage</td>
</tr>
<tr>
<td>• Fatigue</td>
<td></td>
<td>both (e.g., acceptance, distraction, relaxation techniques, planned</td>
</tr>
<tr>
<td>• Cravings (intense urges to eat)</td>
<td></td>
<td>indulgences, etc.).</td>
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</tbody>
</table>
AHA/ACC/TOS 2013 Guidelines
Behavioral Lifestyle Interventions for Obesity

Key Elements of Lifestyle Interventions (Wadden & Butryn, 2003)

- Diet
- Physical Activity
- Behavioral Therapy
  - Goal-setting
  - Self-monitoring
  - Stimulus Control
  - Problem Solving
  - Cognitive Restructuring/Reframing
  - Relapse Prevention/ Coping Skills Training
“Don’t step on it... it makes you cry.”
DID SOMEONE SAY DIET, OH NO!!
Health Benefits of Weight Loss

- Weight loss of 5%–10% in obese individuals with type 2 diabetes, hypertension or dyslipidemia resulted in:
  - Improved glycemic control\(^1\)
  - Reduced blood pressure\(^2\)
  - Improved lipid profile\(^2\)
- “Several studies demonstrate that small losses...help reduce obesity-related comorbidities and that improvements in these risk factors persist with maintenance of these modest weight losses.”\(^3\)

— Institute of Medicine

Current Nutrition Guidelines – Incorporating the NLA Recommendations Part 2

Lori Alexander, MSHS, RDN, CCRC, CLS, FNLA

NLA Scientific Sessions
May 22, 2016
No disclosures to report
Primary Learning Objectives

- Describe effective diet and lifestyle strategies for long-term dyslipidemia and obesity management
- Describe the association of specific dietary patterns and the role they play in the prevention and treatment of ASCVD
- Learn how nutritional supplements can enhance reductions in atherogenic cholesterol
- Compose a clinical care plan for reducing risk of CVD in patients with dyslipidemia
Presentation Outline

Part 1: NLA Part II Recommendations

Part 2: Impact of Dietary Patterns and Macronutrients on Lipids

Part 3: Practical Approach to Weight Loss

Part 4: Effect of Nutritional Supplements on Lipids
NLA Part II Nutrition Recommendations for Dyslipidemia Management

- NLA Part II recommends healthy dietary patterns as an integral component of treatment plans for management of dyslipidemia and ASCVD event risk reduction at all levels of risk
- <7% of energy from saturated fatty acids
- Minimal intake of trans fatty acids
- <200 mg/day dietary cholesterol
- Alcohol in moderation (if of legal drinking age!)
- Manage overweight or obesity; weight loss of 5-10%
- May use plant sterols/stanols and viscous fiber
- Manage TG levels >150 mg/dL with lifestyle therapy and TG >1000 mg/dL with <15% of calories from fat
NLA Part II Nutrition Recommendations for Dyslipidemia Management

- Therapeutic doses of EPA/DHA 2-4 g/day for TG lowering
- >2 servings/week of fish/seafood
- Consider 1 g/day EPA/DHA for patients with known ASCVD or heart failure
- ALA intake of 0.6-1.2 % of energy
- At least 3 servings/day of fiber-rich whole grains
- >4 servings/week of nuts/legumes
- Use of soy protein foods as replacement for foods high in saturated fat
- Nutrition education by a RDN with follow-up and monitoring
Part 2

The Impact of Dietary Patterns and Macronutrients on Lipids
## Components of the DASH Diet (based on 2000 kcal daily)

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Daily Servings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains (whole grains recommended)</td>
<td>6-8 [½ cup servings]</td>
</tr>
<tr>
<td>Vegetables</td>
<td>4-5</td>
</tr>
<tr>
<td>Fruits</td>
<td>4-5</td>
</tr>
<tr>
<td>Fat-Free or Low-Fat Dairy</td>
<td>2-3</td>
</tr>
<tr>
<td>Lean Meat, Poultry, and Fish</td>
<td>6 or less [1oz lean meat/fish or 1 egg]</td>
</tr>
<tr>
<td>Nuts, Seeds, and Legumes</td>
<td>4-5 weekly</td>
</tr>
<tr>
<td>Fats and Oils</td>
<td>2-3</td>
</tr>
<tr>
<td>Sweets and Added Sugars</td>
<td>5 or less weekly</td>
</tr>
</tbody>
</table>

Predimed
Prevención con Dieta Mediterránea
Primary Prevention of Cardiovascular Disease with a Mediterranean Diet: The PREDIMED trial

- Participants (n = 7447) at high CVD risk with no CVD were randomly assigned to:
  - Mediterranean diet supplemented with \approx 50 \text{ g/d of extra-virgin olive oil} (1 \text{ L/week/family})
  - Mediterranean diet supplemented with \textbf{mixed nuts} (30 \text{ g/d}; 15 \text{ g walnuts}; 7.5 \text{ g almonds}; 7.5 \text{ g hazelnuts})
  - Control diet (advice to reduce dietary fat)

- Participants received quarterly individual and group education sessions and either free extra-virgin olive oil or mixed nuts.

- The primary end points was the rate of major CV events (myocardial infarction, stroke, or death from CV causes). The trial was stopped after 4.8 years and not continued for 6 years, as planned.

PREDIMED Trial: The Incidence of Acute Myocardial Infarction, Stroke, and Death from Cardiovascular Causes by Treatment

Primary End Point (acute myocardial infarction, stroke, or death from cardiovascular causes)

- Med diet, EVOO: hazard ratio, 0.70 (95% CI, 0.53–0.91); P = 0.009
- Med diet, nuts: hazard ratio, 0.70 (95% CI, 0.53–0.94); P = 0.02

<table>
<thead>
<tr>
<th>No. at Risk</th>
<th>Control diet</th>
<th>Med diet, EVOO</th>
<th>Med diet, nuts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2450</td>
<td>2543</td>
<td>2454</td>
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<td></td>
<td>2268</td>
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<td>2343</td>
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<td>2320</td>
<td>2093</td>
</tr>
<tr>
<td></td>
<td>1583</td>
<td>1987</td>
<td>1657</td>
</tr>
<tr>
<td></td>
<td>1268</td>
<td>1687</td>
<td>1389</td>
</tr>
<tr>
<td></td>
<td>946</td>
<td>1310</td>
<td>1031</td>
</tr>
</tbody>
</table>

Effect of Dietary Cholesterol on Total-C and LDL-C Levels

- More recent meta-analysis of 40 studies (Berger et al. 2015)
- NLA Expert Panel – available data consistent with conclusion that dietary cholesterol has modest effects to increase total-C and LDL-C levels on average, although there are hypo- and hyper-responders in the population
- <200 mg/day dietary cholesterol
Types of Saturated Fat

- Lauric acid (12:0)
- Myristic acid (14:0)
- Palmitic acid (16:0)
- Stearic acid (18:0)*

*Effect is neutral as it is converted to monounsaturated fat in the body

Current intake of saturated fat in US
= 11% of calories

http://www.cfsan.fda.gov/~dms/qatrans2.html#s1q2
TFAs

- **Facts About TFA**
  - More densely packed than the *cis* mono fatty acids
  - ~ 2-3 % of energy intake is TFA

- **If TFA Are Consumed in High Amounts**
  - ↑ LDL-C
  - ↓ HDL-C

- **Major Sources of Dietary TFA**
  - Baked goods (cookies, donuts, biscuits, pies)
  - Snack foods (crackers, chips)
  - Stick margarine, shortening (fries, fried foods)
Mono- Unsaturated Fatty Acids (MUFAs)

- National dietary guidelines increasingly recommend MUFAs*
- Consumption of MUFA
  - Promotes healthy lipid profiles
  - Mediates blood pressure
  - Improves insulin sensitivity
  - Regulates glucose levels
- * Enhancing MUFA intakes up to 25% of energy

Poly-Unsaturated Fatty Acids (PUFAs)

- Fatty acids that contain more than one double bond in their backbone
- Some omega 3 (alpha-linolenic acid) and omega 6 (linoleic acid) are ‘Essential’ in diet since mammals lack ability to add double bonds in fatty acids beyond carbon 9 and 10
OmniHeart – randomized, controlled feeding trial evaluated the effects of 3 variants of the DASH dietary pattern on lipoprotein lipids and BP in patients with pre-HTN and stage 1 HTN (Appel 2005):

1) high CHO, low sat. fat (58% CHO, 27% fat, 15% protein)
2) higher protein diet where 10% of CHO replaced with mixed-source protein
3) unsat. Fat diet where 10% of CHO replaced with unsat. Fats (8% MUFA, 2% PUFA)
Table 2. Changes from baseline lipoprotein lipid levels by diet in OmniHeart

<table>
<thead>
<tr>
<th></th>
<th>Habitual Baseline Diet (Various)</th>
<th>Carbohydrate Diet (58/15/27)</th>
<th>Protein Diet (48/25/27)</th>
<th>Unsaturated Fat Diet (48/15/37)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean, mg/dL</strong></td>
<td>129</td>
<td>-11.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-14.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-13.1&lt;sup&gt;a,b&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>LDL-C</strong></td>
<td>154</td>
<td>-11.9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-17.3&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-15.1&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Non-HDL-C</strong></td>
<td>50</td>
<td>-1.4&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-2.6&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.3&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>HDL-C</strong></td>
<td>102</td>
<td>0.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-16.4&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-9.3&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Triglycerides</strong></td>
<td>74</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: LDL-C, low density lipoprotein cholesterol; HDL-C, high-density lipoprotein cholesterol, non-HDL-C, non-high-density lipoprotein cholesterol. Different letters denote statistically significant differences in response, p < 0.05

Consumption of 250-550 mg/day EPA and DHA associated with a 36% lower risk of CHD death and reduced mortality by 17% (Mozaffarian, Rimm 2006)

2010 DGA recommended 250 mg/day of EPA and DHA (USDA and HSHHS 2010)

Academy of Nutrition and Dietetics recommends 500 mg/day (Vannice 2014)

AHA 2020 issued impact goals to improve the CV health of all Americans included a recommendation for fish: > 2, 3.5 oz. servings/week (preferably oily fish) (Lloyd-Jones 2010)
Management of TG

- Weight loss – a 5-10% weight loss lowers TG about 20%
- Mediterranean diet pattern is consistently shown to lower TG
- A low fat diet that is high in refined starches and simple CHO’s is not recommended
- Partial replacement of refined grains and added sugars with fiber-rich whole grains and other complex CHO will lower TG
- Preferred dietary substitute for refined grains and simple sugars are foods high in unsat. Fats, protein and fiber-rich whole grains, nuts, seeds and legumes
Part 3

Practical Approach to Weight Loss
US Obesity Rates

- Rate inched up to 27.7% in 2014; was 27.1% in 2013 and 25.5% in 2008
- Increased most among Americans aged >65 since 2008 (Gallup-Healthways well-being index)
- Another self-reported government survey, the Behavioral Risk Factor Surveillance System – 29.4% for age >18 in 2013
- CDC uses clinical measurements of ht/wt as part of NHANES – latest from 2011-2012 – 34.9% obesity rate for adults age > 20
200-300 kcal Increase in Mean Caloric Intake in U.S. Since 1970’s (Mostly carbohydrates)

http://www.cdc.gov.revproxy.brown.edu/nchs/data/hus/hus05.pdf#027
Effects of Weight Loss on Lipoprotein Levels

- Review of RCT’s show clinically meaningful changes in CVD risk indicators are associated with a loss of at least 2.5-3% of body weight (Bays 2013)
- Sustained weight loss of 5-8 kg results in a mean LDL-C reduction of 5 mg/dL, a mean increase in HDL-C of 2-3 mg/dL and > 15 mg/dL decrease in TG
- Loss of at least 3% body weight also produces favorable changes in other ASCVD risk indicators – blood pressure, glycemia and insulin resistance (Bays 2013)
Exercise or Caloric Restriction for Weight Loss: Achieving 300 kcal Negative Energy Balance

Reduce intake by:

- Eliminating 2 oz potato chips
- Substituting 2 diet sodas for 2 regular sodas

Or increase activity by:

- Running 3 miles in 30 min
- Bicycling 8 miles in 30 min
322 moderately obese subjects were randomly assigned to one of three diets:

- Low-fat, restricted-calorie (n=104);
- Mediterranean, restricted-calorie, (n=109);
- Low-carbohydrate, non-restricted-calorie (n=109).

A comparison of weight-loss diets with different compositions of fat, protein, and carbohydrates among overweight adults. The diets consisted of similar foods and met guidelines for cardiovascular health. The participants were offered group and individual instructional sessions for 2 years. The primary outcome was the change in body weight after 2 years in two-by-two factorial comparisons of low fat versus high fat and average protein versus high protein and in the comparison of highest and lowest carbohydrate content.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Low Fat, Average Protein</th>
<th>Low Fat, High Protein</th>
<th>High Fat, Average Protein</th>
<th>High Fat, High Protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein (%)</td>
<td>15 18 20</td>
<td>25 22 21</td>
<td>15 18 20</td>
<td>25 23 21</td>
</tr>
<tr>
<td>Fat (%)</td>
<td>20 26 27</td>
<td>20 26 28</td>
<td>40 34 33</td>
<td>40 34 35</td>
</tr>
<tr>
<td>SFA (%)</td>
<td>&lt; 8% 8 8</td>
<td>&lt; 8% 8 9</td>
<td>&lt; 8% 9 10</td>
<td>&lt; 8% 9 11</td>
</tr>
</tbody>
</table>

Breakfast Makeover:
Replace Simple Carbohydrates with Fiber, MUFA/PUFA

Original Breakfast

12 oz café mocha
270 Calories

Blue Berry Muffin
120 g
460 calories

16 oz juice
204 calories

= 934 cal

Breakfast Makeover

Coffee with 2 oz skim milk
40 calories

2 medium slices of Turkey bacon
80 calories

1 small Bran muffin (66g)
180 calories

Small banana
120 calories

= 420 cal
Address the Obesity Epidemic via Small Changes Approach*

- Small changes are more feasible to achieve and maintain than large changes
  - 2000 more steps/day (expends extra 100 kcal)
  - Simple food substitutions (Replace regular 12-oz soda with diet soda, ↓ caloric intake 150 kcal)
- Small changes can impact body weight regulation
  - Slight energy discrepancy (higher intake + lower output) has created an “energy gap” → weight gain
  - Average energy gap in adults is ~ 100-200 kcal/day

*Report of the Joint Task Force of the American Society for Nutrition, Institute of Food Technologists, and International Food Information Council; Endorsed by the American Dietetics Association, the American Heart Association and the American Cancer Society


1. Individualized balance of Carbs / Fats / Protein for sustained adherence—Focus on FOOD
   - Right Fats (mono- and poly- unsaturated, omega 3’s)
   - Right Carbs (high fiber, low glycemic index, complex)
   - Right Protein (plant, marine, and lean animal sources)
2. Limit or eliminate sugar, high fructose corn syrup, and refined starches and snack foods
3. Reduce or eliminate all calories from beverages
4. Smaller portions, low energy density, high nutrient density
5. Consider book-keeping of calories, points, etc
6. Drink (and eat) water
7. Exercise for life
8. Get adequate sleep
Part 5

The Effect of Nutritional Supplements on Lipids
Plant Sterols and Stanols

- Occur naturally
- Are structurally similar to cholesterol
- Mechanism of action – reduces intestinal cholesterol absorption by competing with cholesterol for limited space in mixed micelles, results in reduced hepatic cholesterol content, upregulation of hepatic LDL-C receptors that remove apo-B containing lipoproteins
- ~150-400 mg/d provided by typical western diet
- Higher intakes (1-3 g/d) are needed to ↓ atherogenic lipoproteins
- >40 (also called phytosterols)
Viscous Fibers for Lowering Atherogenic Lipoproteins

- TC, LDL-C, Apo B, and non-HDL-C are lowered by viscous fibers\(^1\)
- Insufficient evidence available to determine if the type of viscous fiber has a material impact on clinical response
- Meta-analysis from 55 studies of oat fiber, psyllium, pectin, and guar gum indicates that each gram of viscous fiber in the “practical” range of 2-10 g/d → ↓1.7 mg/dL in LDL-C\(^2\)
- Adding 5-10 g/d of viscous fiber to the diet would be expected to → ↓ LDL-C by ~6.5-13%

Apo B = apolipoprotein B

1. FDA. 2008.
1. **Control Diet**
   - Very low in saturated fat
   - Whole wheat cereals
   - Low-fat dairy foods

2. **Control Diet + Lovastatin 20 mg/day**

3. **Portfolio Diet (high in 4 components)**
   - Plant sterols (1 g/1000 kcal)
   - Soy protein (21.4 g/1000 kcal)
   - Viscous fibers (9.8 g/1000 kcal)
   - Almonds (14 g/1000 kcal)

Results of Portfolio Diet: Lipids and CRP

Summary
NLA Part II Nutrition Recommendations – Take Home Pearls

- Decrease consumption of saturated fats and \textit{trans} fatty acid, limit cholesterol intake
- Increase dietary intake of MUFA and PUFA
- Increased dietary and supplemental fiber
- Plant sterols and stanols (2 g/d)
- Fish/seafood or EPA/DHA supplements
- Soy protein, nuts
- Weight loss if needed, exercise
- Alcohol in moderation
- Referral to a registered dietitian nutritionist
Resources


AHA
- AHA – My Life Check ™ - http://mylifecheck.heart.org/

NHLBI

AND
- Find a Registered Dietitian - http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/index.html

USDA/HHS
EXERCISE
THE "E" WORD !!
“If exercise could be purchased in a pill, it would be the single most widely prescribed and beneficial medicine in the nation.”

—Dr. Robert Butler, former Director National Institute of Aging
“The exercise books are up those three flights of stairs.”
JUST MOVE AND MOVE OFTEN

HOW MUCH PHYSICAL ACTIVITY?
REALITIES OF PHYSICAL ACTIVITY AND EXPECTED BODY WEIGHT LOSS
HOW DO YOU GET THE PATIENT INVOLVED IN THE PLAN?
HOW ARE YOUR RECOMMENDATIONS IN CONCERT WITH NLA PART 1 & 2 RECOMMENDATIONS?
KEY POINTS ON PHYSICAL ACTIVITY AND WEIGHT LOSS

• ASSESS BASELINE PA: How physically active are you?
• How much physical activity for meaningful weight loss
• Weight loss vs fat loss
• Great Expectations: weight loss and exercise
• Practical strategies to get your patients (and you) moving
Just move
and move often!
Physical activity vs. Fitness

**Generalized physical activities irrespective of intensity**

Total kcal/day/wk

**Aerobic capacity “capacity and intensity driven”**

Max VO2
How Physically Active Are You?

An assessment of level and intensity of physical activity
Rapid Assessment of Physical Activity

Physical Activities are activities where you move and increase your heart rate above its resting rate, whether you do them for pleasure, work, or transportation.

The following questions ask about the amount and intensity of physical activity you usually do. The intensity of the activity is related to the amount of energy you use to do these activities.

Examples of physical activity intensity levels:

<table>
<thead>
<tr>
<th>Light activities</th>
<th>Moderate activities</th>
<th>Vigorous activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>- your heart beats slightly faster than normal</td>
<td>- your heart beats faster than normal</td>
<td>- your heart rate increases a lot</td>
</tr>
<tr>
<td>- you can talk and sing</td>
<td>- you can talk but not sing</td>
<td>- you can’t talk or your talking is broken up by large breaths</td>
</tr>
<tr>
<td>Walking Leisurely</td>
<td>Fast Walking</td>
<td>Stair Machine</td>
</tr>
<tr>
<td>Stretching</td>
<td>Aerobics Class</td>
<td>Jogging or Running</td>
</tr>
<tr>
<td>Vacuuming or Light Yard Work</td>
<td>Strength Training</td>
<td>Tennis, Racquetball, Pickleball or Badminton</td>
</tr>
<tr>
<td></td>
<td>Swimming Gently</td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>Description</td>
<td>Yes</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>1</td>
<td>I rarely or never do any physical activities.</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>I do some <strong>light</strong> or <strong>moderate</strong> physical activities, but not every week.</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>I do some <strong>light</strong> physical activity every week.</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>I do <strong>moderate</strong> physical activities every week, but less than 30 minutes a day or 5 days a week.</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>I do <strong>vigorous</strong> physical activities every week, but less than 20 minutes a day or 3 days a week.</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>I do 30 minutes or more a day of <strong>moderate</strong> physical activities, 5 or more days a week.</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>I do 20 minutes or more a day of <strong>vigorous</strong> physical activities, 3 or more days a week.</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>I do activities to increase muscle <strong>strength</strong>, such as lifting weights or calisthenics, once a week or more.</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>I do activities to improve <strong>flexibility</strong>, such as stretching or yoga, once a week or more.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

ID #  
Today's Date __________________________
Scoring Instructions

RAPA 1: Aerobic
To score, choose the question with the highest score with an affirmative response. Any number less than 6 is suboptimal.
For scoring or summarizing categorically:
Score as sedentary:
1. I rarely or never do any physical activities.

Score as under-active:
2. I do some light or moderate physical activities, but not every week.

Score as under-active regular – light activities:
3. I do some light physical activity every week.

Score as under-active regular:
4. I do moderate physical activities every week, but less than 30 minutes a day or 5 days a week.
5. I do vigorous physical activities every week, but less than 20 minutes a day or 3 days a week.

Score as active:
6. I do 30 minutes or more a day of moderate physical activities, 5 or more days a week.
7. I do 20 minutes or more a day of vigorous physical activities, 3 or more days a week.

RAPA 2: Strength & Flexibility
I do activities to increase muscle strength, such as lifting weights or calisthenics, once a week or more. (1)
I do activities to improve flexibility, such as stretching or yoga, once a week or more. (2)
Both. (3)
None (0)
Based on known therapeutic effects of habitual physical activity, ACSM makes the following recommendations regarding exercise prescription of persons who are: overweight or obese: *

**Primary activity:** aerobic exercise  
**Intensity:** 40-60% aerobic capacity (V02R)  
**Frequency:** 5-7 days a week  
**Duration:** 30-60 min/day and progressing to 300 minutes/week of mod. Intensity PA

*This amount of physical activity is consistent with recommendations for long-term weight control: 200-300 minutes/wk mod. PA or ≥ 2,000 kcal/wk). This volume may be accumulated with repeated exercise bouts of ≥ 10 minutes.
<table>
<thead>
<tr>
<th><strong>Public Health</strong></th>
<th><strong>Weight Loss</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>150 minutes/week = 30 min/day x 5 days/wk</td>
<td>250-300 minutes/week = ≥60 min/day x 5 or more days/wk</td>
</tr>
<tr>
<td>~1000 – 1,500 kcal/wk (20-30K+ steps/wk)</td>
<td>~2,000 – 3,000 kcal/wk (40-60K+ steps/wk)</td>
</tr>
</tbody>
</table>

ACSM/AHA Public Health Guidelines 2007
ACSM Exercise Weight Loss Statement 2009
LaForge ACE MES Manual 2014
<table>
<thead>
<tr>
<th>Day</th>
<th>Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>30-min walk (or 7 4-min walks at work)</td>
</tr>
<tr>
<td>Wednesday</td>
<td>30-min walk (or 7 4-min walks at work)</td>
</tr>
<tr>
<td>Friday</td>
<td>30-min walk (or 7 4-min walks at work)</td>
</tr>
</tbody>
</table>

1 weekend day: 2.5 hr+ variable terrain walk-hike (incorporate hills or rolling terrain)

TOTAL weekly time: 240 - 300 minutes or 2000-3000+ kcal, or ~40,000++ added pedometer steps/week*

* Think: ~100-120 or more calories (kcal) per walking mile – heavier people expend more calories per mile. Also think approximately 2000 steps per mile
Body weight loss and body fat loss are not the same thing

Weight

Fat
Anthropometric Measures
(skinfolds and waist circumference)

Lange calipers

Gulick tape
The most reliable skinfold site for reflecting changes in adiposity, including abdominal visceral adiposity, is the subscapular site with the tricep as an alternate site.

Bray 1978
Mensink 2003
Increasing physical activity can significantly reduce abdominal adipose tissue (including waist circumference) and improve insulin sensitivity without significant changes in body weight and/or BMI.

Pandey A. Diabetes Care 2015;38:1494
Yates T et.al. Diabetes Care 2009;32:1404,
Velthuis MJ et.al. Menopause 2009;16:777
van der Heijden et.al. J Clin Endo Met. 2009;94:4292
Carey AL et.al. Exercise Mimetics, Diabetologia, 9/09
Hansen D Diabetologia 2009; 52:1789–1797
Despres JP SYNERGIE Trial EAS 2008
Misra A et.al. , Diabetes Care 2008;31:1282-1287
Ekelund, U et.al. Diabetes Care 2007;30:2101
Dekker M Metabolism 2007;56:332
DiPietro L et. al. JAP 2006
Lee SJ & Ross JAP 2005;99:1220
Duncan GE Diabetes Care 2003;26:557
Ross R et.al. Relat Met Dis 2003;27:204
Mourier A et.al. Diabetes Care 1997;20:385
A large amount of evidence shows that exercise provides the best prevention and treatment for insulin resistance and type 2 diabetes.

Goodpaster 2003
Hawley 2004
Hooumard 2004
Helmrich 1991
Kraus 2004
Ross 2004
Laakosen 2005
Schulze 2005
LaForge 2006
Short 2003
Thyfault 2009
Slentz 2011
Chae 2012
Sluik 2012

R. La Forge/2012
Two key reasons we don’t lose the weight that we think we should in response to physical activity
Net vs. Gross Caloric Cost of Physical Activity

20-minutes of ADL ~ 25-30 kcal

20-minute 3 mph walk (1 mile) ~ 80-90 kcal

Net difference = ~ 50-60 kcal/mile

* At moderate walking speeds the net energy cost for walking one mile is ~60% of the gross cost
Variables That Determine Total Net Energy Expenditure in Response to an Exercise Program

**Energy Compensation**
Increased food intake (CHO, beverages) as a result of appetite stimulation

**Energy Conservation**
Decreased spontaneous physical activity as a result of “decreased energy”

↓ RMR
“The modern world makes it very easy to out-eat exercise, and nearly impossible to out-exercise excessive eating”

David Katz
Yale University Prevention Research Center
1 scone = 140 - 500 calories
5-10 minutes
=
1.4 – 5 mile walk
25 – 90 minutes
Just move and move often!
Start by adding ~1000 kcal of physical activity per week

This is equivalent to ~9-10 miles/week of walking or ~ 20,000 pedometer steps
What is ~1000 kcal of Physical Activity?

Assumes 150-170 lb body weight (heavier individuals expend more kcal)

10 miles of walking at ~3 mph *
2.5-3 hours of continuous exercise at ~55-65% of maximum effort level
Three 45-50 minute aerobics classes
3-hour hike over variable terrain with 10 lb backpack
3 hours of cycling at 10-12 mph
3 sets of singles tennis
3 miles of freestyle swimming (women)
2.5 miles of free-style swimming (men)

* Note that you don’t have to do the above activities all at once but you can spread each out over the course of a week
Variable Terrain Walking
Neighborhood Circuit

H

~300+ kcal

1 mile

1 mile
Multi-intensity continuous aerobic exercise session
REDUCE SITTING TIME
Workplace EE

5 min/hr \times 7 \text{ hrs}

35 \text{ min} \at \ 3-4 \text{ kcal/min}

2000-2500 \text{ steps}

\textbf{100 – 140 kcal/day} \hspace{1cm} \text{(insulin sensitization – e.g., 10-15 mg metformin)}
Systematic pedometry

Count your steps!
Pharmacology of Pedometry

Metformin (Glucophage)
Each step

**Liver**
- Increases Fatty Acid Oxidation (Ketogenesis)
- Decreases Cholesterol Synthesis
- Decreases Lipogenesis

**Skeletal Muscle**
- Increases Fatty Acid Oxidation
- Increases Glucose Uptake

**Pancreatic Islets**
- Modulates Insulin Secretion

**Adipocytes**
- Decreases Lipogenesis
- Decreases Lipolysis
Daily Step Rx:

6,000  3-5 yrs
10,000 Adults
12,000 6-19 yrs

"Every step you take I'll be watching you."
- Sting

Colley R Med Sci Spts Ex 2012;44977
Rx for Outpatient Exercise Pedometry

Patient name: Date:

Therapeutic code:

Order for following patient physical activity pedometer:

☐ Pedometer: Eagle 2720 pedometer

Rx: steps/day ____ steps/week/month ____ / ____

Other Rx:

Patient instructions: See attached physical activity and pedometer guidelines

M.D.

Referring provider/physician
Diverse types of daily physical activity
✓ Utilitarian-domestic activities add energy expenditure and reduce risk

Yardwork
Gardening
Housework
Painting, cleaning, shoveling, scrubbing, washing
Repair work
ADL’s
Diverse types of moderate exercise is also associated with lower incidence of diabetes and CVD mortality.

This includes such utilitarian activities as walking, gardening, climbing, and household/yard chores. Those who expend 1000 - 1500 kcal per week in such utilitarian activities may require very little additional exercise to lower diabetes and CVD risk.

Lakka TA. Et.al. NEJM 1994;330:1549
Fransson E. et.al. Scan J Pub Health 2003;31:324
Meisinger C et.al. Diabetologia 2005;48:27
Marcus B et.al. Circ. 2006;114: 2739
Holme I et.al. BMC Public Health 2007, 7:154
Household-Community Circuit Rx

- 2-minute rest/water break between stations
- Always start and end session with warm-up/cool down exercise as prescribed
- Do not continue exercise or go the next station if you experience chest discomfort, palpitations, dizziness or unusual fatigue

Name
Date
Rx:

20 - 90 minutes

R. La Forge/2012
Utilitarian household and yard chore circuit "workouts" that can be systematically and creatively organized into one productive workout expending 150-500 kcal. Prediabetes and diabetes-centric focus.
Conclusion

Just move and move often!
Summary

- Obesity is a common and everyday growing problem for our patients.
- Patients often suffer physically and emotionally from this disease.
- Patients would like to change but have no idea about how to go about it with many mixed messages from media, fads, and lack of understanding.

We welcome your questions at this time !!!!