Fats: Dietary Guidelines for Americans
FAT CALORIES

FOR EVERY GRAM OF FAT YOU EAT = 9 CALORIES

Animals

Plants
Assignment for everyone: Pick your favorite ice cream

• Visit a supermarket’s frozen food section

• Find your favorite ice cream
Record the following information

- Serving size
- Calories
- Total fat (grams)
- Saturated fat (grams)
- Trans fat (grams)
- Cholesterol (milligrams)
- Sodium (milligrams)

Bring information to class
Assignment for one volunteer

• Find sorbet in the supermarket

• Collect the same information
GOOD ROLE OF FATS

• Energy
• Cell membranes
• Absorb vitamins (A, D, E, K) and antioxidants in food
• Need “essential” fats
• Growth: children
• Development: brain/nervous system—children
BAD ROLE of FATS

↑ Obesity

↑ Some Cancers

↑ Heart Disease

↑ Blood Clots
Fat and Your arteries

Fat: Heart Arteries = Heart Attack

Fat: Brain Arteries = Stroke
Heart attack death: San Francisco 49ers offensive lineman-Thomas Herrion (2005)

• **23** years old; 6 feet 3 inches, 315 pounds
• After exhibition game
• Not drug related
• **Significant blockage:** right coronary artery
• Enlarged heart
Ex-Celtic Johnson dead at age 52
Lipids + Fats = Lipoproteins

• Low Density Lipoprotein (LDL) “Bad Cholesterol”

• High Density Lipoprotein (HDL) “Good Cholesterol”
Total Fat in Your Diet

- Adult: Reach **Healthy** Body Weight

- **Stay in Energy Balance**
  Calories In = Calories Out

- **Adjust Fat Calories** (**Energy Rich**)
“Follow the Grams”

• **Total Fat** Limit each day = **65 grams**

• Based on **2000** calorie **reference diet**
EXAMPLE

My Chocolate Bar = 11 grams of fat

65 grams - 11 grams = 54 grams of fat - limit
rest of day
ASSIGNMENT

Next Class:

Bring in your favorite chocolate bar or Wrapper from your favorite chocolate bar

Be ready to read: Nutrition Facts: Fat
Fats: Grams vs. Calories

What if you:

A) Are in energy balance &
B) Eat much less or much more than 2000 calories/day

How do you figure out your grams of fat/day?
SIMPLE MATH

1. Divide your total calories/day by 2000;

2. Multiply this number by 65;

3. Gives your specific daily fat limit in grams
• What is your total fat limit/day if you eat 1500 calories/day?
Answer

\[
\frac{1500}{2000} = 0.75 \times 65 = 48 \text{ grams}
\]
• What is your total fat limit/day if you eat 2500 calories /day?
Answer

\[
\frac{2500}{2000} = 1.25 \times 65 = 81
\]

grams
SATURATED FAT = BAD FAT

• Higher amounts in:
  Meats
  Whole Milk
  Cheese
  Ice Cream
  Many Prepared Foods
SATURATED FAT = BAD FAT

• Most Plants: Low Amounts of Saturated Fat

• Exceptions: Palm & Coconut oil

• Ingredients: look for these words
FATS & OILS
SATURATED FAT - BAD FAT

Recommendation:
Less than 20 grams per day

Limit:
(examples - contain 6 or more grams per serving*)

beef (chuck), bologna, burritos, cheeses
(cheddar, cream) enchiladas, frozen dinners
(some), gravies (some), hamburger, ham loaf,
hot dog (beef), ice cream, lamb chops, meat
loaf, cheese omelet, pastas with cheese, parmi-
giana (chicken, veal, eggplant), pies (some),
pizza, sauces (some), sausage, spareribs,
steaks, tacos

*Sources: The T-Factor Fat Gram Counter, 1999, Pipher, J. and M. Kalmus. W.W. Norton &
Company, Inc. New York, N.Y.
↑ Saturated Fat  ↑ LDL

↑ Risk Heart Disease

Women  ↑ Risk Breast Cancer
If you already have high LDL levels.....

Eat less than **15.5** grams/day of saturated fat

* Saturated Fat: One of the most dangerous fats you can eat
Smart ways to reduce Saturated fat in your diet:

- Lean, low-fat, fat-free foods
- Choose low fat/extra lean meats
- Remove skin
- Roast or bake instead of frying
- Choose low fat dessert
Smart Way to cut back on Saturated Fat
Same amount of food shown

Saturated Fat

**Higher**
- Regular Cheese (6.0 grams)
- Regular Ground Beef (6.1)

**Lower**
- Low Fat Cheese (1.2 grams)
- Extra Lean Beef (2.6)
<table>
<thead>
<tr>
<th>Saturated Fat</th>
<th>Higher</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Milk</td>
<td>(4.6 grams)</td>
<td>Low Fat Milk</td>
</tr>
<tr>
<td>Croissant</td>
<td>(6.6)</td>
<td>Bagel (oat bran)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.2)</td>
</tr>
</tbody>
</table>
Saturated Fat

**Higher**
- Regular Ice Cream (4.9 grams)
- Butter (2.4)

**Lower**
- Frozen, Low Fat Yogurt (2.0)
- Soft Margarine (0.7)
Saturated Fat

**Higher**
Chicken leg fried/ with skin
(3.3 grams)

**Lower**
Fried Fish
(2.8)

Roasted Chicken Breast, Skinless
(0.9 grams)

Baked Fish
(1.5)
Smart Ways to Cook

Smart Way

Broiling/Roasting/
Grilling on rack (fat
drips away)

Better Than

Frying

Baking, Steaming

Saturated

Fat
Smart Ways to Cook → Saturated Fat

**Smart Way** Better Than

Liquid Vegetable Oil (Canola, corn, olive, etc.)

Butter, Lard
Smart Ways to Cook ▼ Saturated Fat

**Smart Way**

Non-stick pans, Vegetable sprays

**Better Than**

Butter, Lard, Stick Margarine

Trim Fat from Meat

No Trimming
Trans Fat: Bad Fat

↑ LDL  ↓ HDL

↑ Heart Disease Risk

A protester in New York where the health department is holding public hearings on trans fats.
A customer leaves a KFC eatery yesterday in Montgomery, Ala., the same day the chain was hit by a lawsuit by a health-advocacy group that wants KFC to stop frying chicken in partially hydrogenated oil.
The Colonel is sued
NY Times 6/18/06
Recommendation:

Eat as little as possible.

Food Label Key Words: “hydrogenated”, “partially hydrogenated”, “trans fat”

Limit These: cakes, cookies, crackers, pies, bread, some margarines, French fries, potato chips, corn chips, buttered popcorn, shortenings.
Trans Fat: What to Do

• Look for "partially hydrogenated"
• Eat less processed foods
• **Use liquid, tub, spray or "trans free" margarine**
• **Avoid butter, stick margarine**
• **Read ingredients: food labels**
Headlines

• NY Times 1/3/07 “Starbucks cuts use of trans fats”

• Globe 1/30/07 “McDonald’s will roll out trans-fat-free oil in fries”

• UMass Lowell Aramark: March 2007: will cut trans fats from fryers
Beyond Trans Fats: Calories

- Great Indiana State Fair: **bans** trans fats from fryers
- Switch to **soybean oil**
- But everything is **deep fried**
Beyond Trans Fats: Calories

**Combo platter:** battered/deep fried:
- 1 Snickers bar
- 2 Oreos
- 1 Reese’s Peanut butter cup

> > 700 calories
Cholesterol: Bad Role

Cholesterol in foods \( \rightarrow \) LDL \( \uparrow \)

Heart Attack \( \uparrow \) Stroke

Foods high in cholesterol: eggs (yolk), Liver, kidney, many prepared foods
FATS & OILS

CHOLESTEROL - BAD FAT

Recommendation:

less than **300** milligrams per day

**Limit:**
[examples - contain 100 or more milligrams per serving*]

beef (chuck), cheese souffle, chicken leg with skin, desserts (eclair, mousse, some pies), eggs, frozen dinners (some), ham loaf, kidney, lamb (leg), liver, lobster newburg, meatloaf, parmigiana (chicken, veal), pastas with cheese (some), quiche, shrimp creole, spareribs, steak (chicken fried, salisbury), sub sandwich (salami & cheese)

Polyunsaturated &
Monounsaturated Fats

Good Fats

↓  Blood Cholesterol

↓  Heart Disease Risk
**Recommendation:**

Polyunsaturated
Monounsaturated less than 45 grams per day

**Food label Key Words:**
polyunsaturated, monounsaturated

**Consider These:**
- flaxseed, nuts (unsalted),
- seeds (sesame, sunflower)
- liquid vegetable oils: canola, corn, olive, safflower, soybean, margarine (trans-free tub, liquid, spray)
Get most of your FAT calories from poly’s & mono’s - *Limit saturated fat*

- Polyunsaturated and Monounsaturated Fats
- Saturated and Trans Fats
## COMPARISON OF DIETARY FATS

<table>
<thead>
<tr>
<th>DIETARY FAT</th>
<th>SATURATED FAT</th>
<th>POLYUNSATURATED FAT</th>
<th>MONOUNSATURATED FAT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mg/Tbsp</td>
<td>Linoleic Acid</td>
<td>Alpha-Linolenic Acid</td>
</tr>
<tr>
<td>Canola oil (New Puritan Oil)</td>
<td>0</td>
<td>22%</td>
<td>10%</td>
</tr>
<tr>
<td>Safflower oil</td>
<td>0</td>
<td>10%</td>
<td>77%</td>
</tr>
<tr>
<td>Sunflower oil</td>
<td>0</td>
<td>11%</td>
<td>69%</td>
</tr>
<tr>
<td>Corn oil</td>
<td>0</td>
<td>13%</td>
<td>61%</td>
</tr>
<tr>
<td>Olive oil</td>
<td>0</td>
<td>14%</td>
<td>8%</td>
</tr>
<tr>
<td>Soybean oil</td>
<td>0</td>
<td>15%</td>
<td>54%</td>
</tr>
<tr>
<td>Margarine</td>
<td>0</td>
<td>17%</td>
<td>32%</td>
</tr>
<tr>
<td>Peanut oil</td>
<td>0</td>
<td>18%</td>
<td>33%</td>
</tr>
<tr>
<td>Chicken fat</td>
<td>11</td>
<td>31%</td>
<td>21%</td>
</tr>
<tr>
<td>Lard</td>
<td>12</td>
<td>41%</td>
<td>11%</td>
</tr>
<tr>
<td>Beef fat</td>
<td>14</td>
<td>52%</td>
<td>3%</td>
</tr>
<tr>
<td>Butterfat</td>
<td>33</td>
<td>66%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Fatty acid content normalized to 100 percent
Easy numbers to remember: food shopping & eating out

Total fat limit: 65 grams
Saturated fat limit: 20 grams
Poly + Mono-
Unsaturated fat: 45 grams

Cholesterol: 300 milligrams
A Polyunsaturated Pig?
“You are what you eat”

- Iowa State University: feed pigs high soybean oil diet
- Polyunsaturated fat in pork; no change in pork cholesterol
- Feed lard, pork chops to women (19-24 years)
- Polyunsaturated Fats Saturated/monounsaturated: blood
- LDL cholesterol
OMEGA MEDICINE?

Is fish oil good for what ails you?

BY BONNIE LIEBMAN
Omega 3: Good Fats - Special Type of Polyunsaturated fat

Protect against:

• Heart attack
• Stroke
• Sudden death
• Lower blood triglycerides
• Help maintain normal heart rhythms
People with arthritis: fish oil capsules + medications: \(\downarrow\) swollen & tender joints: anti-inflammation
Recommendation:

2 Servings per Week*

one serving = 4 ounces

Omega 3 fats may protect against heart disease

Consider These:
Salmon, Mackerel, Tuna, Trout, Pollack, Flounder, Alaska King Crab, Snapper, Shrimp, Haddock, Cod
<table>
<thead>
<tr>
<th>Fish</th>
<th>Omega 3 (grams/four ounces)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmon</td>
<td>2.4</td>
</tr>
<tr>
<td>Mackerel</td>
<td>2.1</td>
</tr>
<tr>
<td>Tuna- fresh</td>
<td>1.7</td>
</tr>
<tr>
<td>Trout</td>
<td>1.1</td>
</tr>
<tr>
<td>Tuna- white</td>
<td>1.0</td>
</tr>
<tr>
<td>(canned in H₂O)</td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td>Omega 3 (grams/four ounces)</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Pollack</td>
<td>0.6</td>
</tr>
<tr>
<td>Flounder</td>
<td>0.6</td>
</tr>
<tr>
<td>Alaska King Crab</td>
<td>0.5</td>
</tr>
<tr>
<td>Snapper</td>
<td>0.4</td>
</tr>
<tr>
<td>Shrimp</td>
<td>0.4</td>
</tr>
<tr>
<td>Tuna-light (in H$_2$O)</td>
<td>0.3</td>
</tr>
<tr>
<td>Haddock</td>
<td>0.3</td>
</tr>
<tr>
<td>Cod</td>
<td>0.2</td>
</tr>
</tbody>
</table>
Word of caution: **Mercury** (poison) found in fish

Mercury in some fish and shellfish

Harm unborn babies or young children
FDA 2004 Advisory

- Pregnant/nursing women
- Women who might become pregnant
- Young children

Avoid:

Shark, Swordfish, King Mackerel, Tilefish: high mercury
Fish vs. Red Meat

Fish:
1. Low in calories & saturated fat
2. Good source: protein, B vitamins, minerals
OMEGA 3

GOOD FATS - PROTECT YOUR HEART

Plant Sources:

- soybean oil
- canola oil
- walnuts
- flaxseed

Omega 3 fats may protect against heart disease
Other interesting things about Omega 3’s
Fish and Prisoners

Does Eating Salmon Lower The Murder Rate?
What omega-3 fatty acids might do for violent behavior. By Stephen Mihm
Fish and Prisoners

• U.S.: highest per capita jail rate
• Within 2 weeks release: ex-prisoners 12.7 X more likely: dead
• 71% deaths: drug overdose
• NIH study: correlation

↑ omega 3 fats ↓ murder rate

• Finland study: prisoners: violent crime: ↓ omega 3’s in blood
• Omega 3’s important part of brain’s frontal cerebral cortex: controls impulsive behavior

• Give omega 3’s: people- substance abuse: “anger” symptoms ↓ 50%
Fish Oil and Coma

Little leaguer (N.J.) - baseball/metal bat

- disrupt heart electrical signals
- heart stopped
- coma
1) Treated: B12 vitamins + fish omega 3’s

2) Dr. Bales: W. Virginia University Medical Center

3) Out of coma, doing well

4) Same treatment: Randal McCloy-survivor Sago Coal Mine disaster 2006
Omega 3’s, Fish, & Your Brain

• Omega 3 fats - abundant in brain’s gray matter (cerebral cortex covering - intelligence)

• Omega 3’s: breast milk: important babies’ brain development

• ↓ brain omega 3’s with age
Gray matter

- **Cingulate gyrus**: plays a role in emotion.
- **Thalamus**: involved in emotion.
- **Hippocampus**: is involved in learning and memory.
- **Amygdala**: is involved in emotion and memory.
Fetus/Placenta need omega 3’s from pregnant woman

• Pregnant women: fish oil supplements (DHA, EPA): Babies—better hand/eye coordination & mental development

• Pregnant women: fish > 3 times/week

1) Babies better IQ scores ("brain food")
Omega 3’s & Aging Brain

- Chicago study: people 65+
  1-2 fish meals/week
  10-13% slower mental decline

- Framingham study: people age 76:
  2.7 fish meals/week
  ↓ 47% risk dementia
  (Alzheimer’s disease)
Food Chain and Omega 3’s

You
Big Fish
Small Fish
Algae make omega 3’s
Martek Biosciences- Maryland

• Isolated/purified omega 3’s from algae
• “Vegetarian Omega 3”
• 2001: FDA allowed use omega 3’s in baby formula (90% formulas in U.S.)
• Nutrition bars- pregnant/nursing women, Soy milk, yogurt, Oj
Omega 3 Enriched Eggs

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Careers > FAQs > Feedback

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Omega 3’s, Fish, & Your Heart

First discovered: 1970’s

Greenland Inuit:

Fatty Fish Diet → Heart
NY Times 10/3/06 “In Europe It’s Fish Oil After Heart Attacks”

- People survive 1 heart attack
  Eat Fish → Risk 2d attack
Fish Oil Capsules

• **Italy**: leader fish oil treatment heart disease

• Mediterranean Diet → baked/broiled fish
• **Rome hospital**: all heart attack **survivors**: prescription- purified omega 3 capsules
Omega 3’s, Fish and Your Eyes

- Omega 3’s - **concentrated:** retina
- Needed - visual acuity
- **Macula:** small, center of retina - where images focused
Age $\uparrow$ Macular Degeneration

- ↓ Visual sharpness
- Black spots in visual field
- Eating fish once/week $\downarrow$ 40% risk
- Fish three times/week $\downarrow$ 75% risk of age-related macular degeneration
Problems: Omega 3’s

- **Frying** fish breaks down Omega 3’s
- Fish oil capsules: FDA: up to 3 grams/day—generally safe
- High intake fish oil: excessive bleeding
Mediterranean Diet

Portugal, Spain, Italy, France, Greece, Turkey, Israel
Mediterranean Diet

- Cholesterol levels
- Longer Life

Mediterranean vs. U.S. Women

- Breast Cancer

Heart Disease
- Cancer
  - Mouth
  - Esophagus
  - Stomach
  - Lungs
  - Intestine
Overall pattern of eating: more important than individual foods. “Food interactions.”

↑ Fruits, vegetables, breads, cereals, beans, nuts, seeds, legumes (fiber, vitamins, minerals)

↓ Processed foods

↑ Seasonal, fresh foods

Daily dessert: fresh fruit

Olive oil = Major fat (? What kind)
Cheese & yogurt = low to moderate

< 4 eggs/week

↓ Red meat

**Fish**

Wine (red) with meals

+ Daily physical activity

Overall:

**Mediterranean Diet:** not low in fat but differs in type of fat vs. U.S. Diet
Mediterranean Diet

- Saturated (animal) fat & cholesterol
- Monounsaturated fat
- Plant proteins: legumes, nuts
<table>
<thead>
<tr>
<th>Diet</th>
<th>Fat Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Traditional- Japan</td>
<td>10%</td>
</tr>
<tr>
<td>*Crete (Mediterranean)</td>
<td>35%</td>
</tr>
<tr>
<td>*Inuit (Greenland)</td>
<td>60%</td>
</tr>
<tr>
<td>North American</td>
<td>33%</td>
</tr>
</tbody>
</table>

*Low Heart Disease

Conclusion?
Harvard “Siesta Study” 2007
Mediterranean Sleep

• Greek men: regular 30 minute nap
  ↓ 37% risk heart disease death
• Reasons?: Biological clock- 2 drowsiness dips: midway through waking hours & before bed time
• ↓ Stress ↓ BP ↓ Heart Rate & helps Immune system- restored
• HEART HEALTH: Diet/ Exercise/ Sleep
NAPS- WILL THEY CATCH ON?
1. Yarde Metals, Inc. Southington, CT
   • Midday nap for employees
   • Nap room- full-body massage chair
   • Aromatherapy/motion: sights & sound of beach/brook

2. Indiana University “Nap Club”
   • 15 beds for students
   • Mon-Thursday 11AM- 3 PM
   • “Moderator”- wakes people up
   • Basis: Most people need 9.5-10 hours sleep: perform optimally
French Paradox

• French Diet: ↑ Moderately high-saturated fat but ↓ heart disease

• WHY?

1. Wine (red) at meals: ↑ HDL
   ↓ Blood clots, antioxidants

2. Portion sizes: Paris vs. Philadelphia
   Paris restaurants ↓ portions
   Supermarkets ↓ candy bars, hot dogs, yogurt
French Paradox

3. French eating **fewer calories**

4. ↓ **Obesity** in France vs. ↑ U.S.

Longevity: French women (84 years) life expectancy second only to Japanese (85.6)

Jeanne Cuisiner (87)

“I eat a lot of vegetables & not much meat.”
Foie Gras (fatty liver)

- Ducks/Geese: force fed with tube-cooked corn
- Delicacy - enlarged liver
- Banned Chicago restaurants & 12 other countries - inhumane treatment animals
Assignment for volunteers: Frozen dinner experts

• Visit a supermarket’s frozen food section.

• Find the following frozen dinners (chicken, any kind): Healthy Choice, Boston Market, South Beach, Hungry Man, Swanson, Stouffer’s Lean Cuisine.
Record the following information

• Serving size and grams
• Calories/gram
• Total fat (grams)
• Saturated fat (grams)
• Trans fat (grams)
• Cholesterol (grams)
• Sodium (grams)

Bring information to class.