Got Salt?

Reducing Sodium in the American Diet

Learning Objectives

- Explore the many uses of salt and sodium
- Review the role of sodium in health
- Discuss health concerns associated with excessive sodium in the diet
- Gain ideas for reducing sodium in the diet

Salt or Sodium?

- Salt = 40% sodium & 60% chloride
- One teaspoon salt weighs ~ 5 grams
- One teaspoon salt contains ~2,300 mg sodium
- Sodium is found in numerous compounds

Economic History of Salt

- Salt has been known, fought over, and valued throughout recorded history
  - In ancient time salt = cash
  - Included among funeral offerings in ancient Egypt
  - Many countries used a ‘salt tax’ to finance operations

Religious History of Salt

- Many religions make reference to salt
  - In Hebrew Bible, 35 verses mention salt
    - i.e., Lot’s wife who was turned to a pillar of salt
    - Prophet Muhammad supposedly said “Salt is the master of your food……”
      “God sent down four blessings……fire, water, iron and salt”
  - Hindu’s use salt in housewarming and wedding ceremonies
  - Shinto (Japanese) use salt for purification rituals
  - Salty bread or salt added to bread is eaten during Kiddush for Shabbat
  - Egyptians, Greeks and Romans offered water and salt to their gods
Salt-isms

- Gifted for wisdom
- Tossed over the left shoulder three times to ward of evil
- “Take it with a grain of salt”

This Mineral Called ‘Salt’

- Most common nonmetallic mineral in the world
- USA has an estimated 55 trillion metric tons
- World uses 240 million tons of salt a year
- U.S. reserves alone sustain needs for 100,000 years.

Every American Born Will Need...

3.3 million pounds of minerals, metals, and fuels in their lifetime

Learn more at www.mii.org

Salt

- 14,000+ known uses
  - Flavoring foods
  - Medicinal / healing
    - Drug formulations, bath salts...
  - Manufacturing
    - pulp/paper, textiles....
  - Safety – food preservation and personal

Sources for Salt

- Sea Water
  - Sea salt
  - Flavor influenced by region
- Salt Mines
  - “Table Salt”
  - Other salts
- ~17% refined for food uses
- Gram for gram = in sodium

Salt Types & Purposes

- Table salt – contains anti-caking ingredient, iodized or non-iodized for food prep
- Kosher salt – contains no additives; coarser in texture
- Sea salt – fine or coarse; carries flavors unique to source
- Pickling salt – fine-grained containing no additives or caking ingredients so brines stay clear
- Specialty salts – (e.g. popcorn salt, margarita salt) varied grain sizes and textures
- Seasoned salt – blend including herbs and other spices
- Salt substitutes – typically replace all or some of the sodium with potassium or magnesium
- Rock salt – large crystal, non-food salt
Salt & Senses

- Salt is one of the five basic tastes
  - Salt, sweet, sour, bitter & umami
- Salt is only taste associated with saltiness
- Other tastes have many triggers
- Salt helps intensify other flavors
- Preference for salt taste is innate
- Level of saltiness is learned
- About 8-12 weeks to lower sodium intake

Salt, Senses & Aging

- Taste
  - Incremental declines beginning in 6th decade
  - Higher detection thresholds: 2-3X higher vs. younger
  - Reduced flavor intensity flavor
  - Reduced flavor discrimination
  - Deficit taste identification
  - Absence or distortions of taste

Salt, Senses & Aging

- Average detection thresholds of elderly vs. youth
  - 11.8 times higher for sodium salts
  - 5.0 times higher for MSG
  - Taste losses for institutionalized patients more severe

What Does Average Person Say?

- Consumers are not thinking much about sodium
  - 23% restrict adding salt to food; but pay no attention food choices
  - 18% say that “food and beverages low in sodium are one of the three most important components of a healthy diet”
  - 26% read labels for sodium
  - 34% do not pay attention to sodium

Dietary Sources of Sodium

- 77% of American’s sodium intake comes from processed and prepared foods
- 12% of total sodium intake consumed is naturally occurring
- 6% is added while eating
- 5% is added during cooking
- <1% from tap water

International Food Information Council, 2010
Sodium in Processed Food

- Very little sodium occurs naturally in foods
- Salt preserves & enhances
- Salt & sodium added to food supply inhibits growth of bacteria, yeasts and molds
  - Protects against spoilage
  - Limits food borne illness

Salt in Food

- Other functions of salt
  - Texture aid (baked goods, cheeses)
  - Fermentation control (sauerkraut, yeast bread)
  - Binder (cured meats)
  - Stabilizer (whipped egg white)

Hidden Sodium in Processed Food

Ingredients that are sodium-containing compounds:

- MSG
- Spice ‘blends’
- Soy sauce
- Fish sauce
- Baking Soda (sodium bicarbonate)
- Stocks and broths
- Sodium benzoate
- Sodium nitrate
- Sodium citrate
- Sodium caseinate
- Celery salt
- Onion salt

Sodium & Health

- Salt or sodium-derived products are everywhere
  - Cells of our bodies swim in a saline solution.
  - Human blood has the same chemical balance of sodium, potassium and calcium found in the oceans
- Essential to maintain health
- Must be consumed

Health Lessons

- Sodium is an essential nutrient
- However, very little sodium needed daily

Sodium DRI

<table>
<thead>
<tr>
<th>Age</th>
<th>Adequate Intake</th>
<th>Tolerable Upper Intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6 months</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>7-12 months</td>
<td>370</td>
<td></td>
</tr>
<tr>
<td>1-3 yr</td>
<td>1,000</td>
<td>1,900</td>
</tr>
<tr>
<td>4-8 yr</td>
<td>1,200</td>
<td>1,900</td>
</tr>
<tr>
<td>9-13 yr</td>
<td>1,500</td>
<td>2,200</td>
</tr>
<tr>
<td>14 – 50 yr</td>
<td>1,500</td>
<td>2,300</td>
</tr>
<tr>
<td>50-70 yr</td>
<td>1,300</td>
<td>2,300</td>
</tr>
<tr>
<td>&gt;70 yr</td>
<td>1,200</td>
<td>2,300</td>
</tr>
</tbody>
</table>

Institute of Medicine, 2004
The Sodium Controversy
- Mean sodium intake 3,450 mg for ~50 years
  - Range: 2,600-5,000mg across 45 countries [McCarron et al. CJASN 2008]
- In 2013, IOM says “no harm” aiming for 2,300mg. And, 1,500 mg may suit some subpopulations
- DASH Diet - sodium at 3,000mg
- AHA – stands behind the 1,500 mg target

Sodium & Health
- Found in all bodily fluids (i.e. blood, sweat...)
- Works with chloride & potassium
- Role of electrolytes:
  - Balance of fluids in the body
  - Maintain acid-base balance of fluids
- Sodium deficiency is uncommon
- Sodium overdosing is possible

Health Concerns
- Bone health
  - Higher intake of sodium increased loss of calcium
  - Apparently no impact from high or low calcium on sodium
- Diuretics
  - Promote an increase in urine production
  - Excess minerals are flushed from the body
  - The reduction in total body water reduces blood volume and pressure
  - Used to treat high BP, CHF, kidney disease
  - Diuretics can have different effects

Effects of Disease
- Cystic Fibrosis (CF)
  - Increased requirement for sodium & chloride
  - Transport of sodium & chloride between body fluids is impaired causing thick and viscous mucus
  - Excessive sodium & chloride in sweat
- Diabetes
  - High blood sugar increases urine output
  - Select medications are associated with low BP

Hypertension
- Hypertension
  - Evenly split between men / women
  - Highest incidence in African-Americans (40%) followed by Mexican American (28.7%) and non-Hispanic whites (27.2%)
- Essential or Secondary
- Blood pressure = measure of force blood exerts against vessel walls as the heart muscle contracts
  - Systolic # (top) measures heart contraction
  - Diastolic # (bottom) measures heart pressure at rest

Blood Pressure

<table>
<thead>
<tr>
<th>Classification of Blood Pressure</th>
<th>Systolic (mmHg)</th>
<th>Diastolic (mmHg)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;120</td>
<td>and &lt;80</td>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td>120-130</td>
<td>Or 80-89</td>
<td></td>
<td>Prehypertension</td>
</tr>
<tr>
<td>140-150</td>
<td>Or 90-99</td>
<td></td>
<td>Stage 1 hypertension</td>
</tr>
<tr>
<td>&gt;150</td>
<td>Or &gt;100</td>
<td></td>
<td>Stage 2 hypertension</td>
</tr>
</tbody>
</table>
The Fact Is:

- Too much sodium increases risk for high blood pressure
- But, potassium and calcium intake play significant role
- Americans consume too much sodium per day – about 50% more than current recommendation...or do they?
- Suboptimal blood pressure is the #1 attributable risk for death worldwide – or is it perhaps obesity, smoking and other chronic disease?
- Population-wide sodium reduction could save 100,000 lives? Or, would it?
- 40 years of attempting to reduce salt in the diet has failed – perhaps because people really have not changed for the worse?

Institute of Medicine Report Brief April 2010

American Heart Association

- Eat a wide variety of nutritious foods daily.
- Fruits and vegetables: At least 4.5 cups a day
- Fish (preferably oily fish): At least two 3.5-ounce servings a week
- Fiber-rich whole grains: At least three 1-ounce equivalent servings a day
- Sodium: Less than 1,500 mg a day
- Sugar-sweetened beverages: No more than 490 calories (36 ounces) a week

Other Dietary Measures:
- Nuts, legumes and seeds: At least 4 servings a week
- Processed meats: No more than 2 servings a week
- Saturated fat: Less than 7% of total energy intake

Quick Quiz

- Does this DASH Diet Menu Sample meet the AHA 1,500mg Sodium recommendation ?????

Breakfast
1/4c Oatmeal with ¼c Unsweet Applesauce
Whole Wheat English Muffin with ½T Jam
6oz Yoplait® Light Yogurt
4oz Pineapple Juice

Lunch
Chicken Waldorf Salad
Wheat Dinner Roll w/ ½T Butter
Baby Carrots – 8 pieces
8 fl oz. Nonfat Milk
½ Cantaloupe

Snack
Light String Cheese - 1
Kiwi - 1

Dinner
4oz Roasted Chicken Breast
Baked Potato w/ ½T Butter & ½T Sour cream
2/3c Asparagus
Tomato Spinach Salad w/ ½T Balsamic Vinaigrette
½c Apple Crisp Topped with 1/2c Frozen Yogurt

So Now What?

The retraining of America’s taste buds?!
- Interested groups recommend a phased approach to lowering allowable salt / sodium
  - 2,000 mg / day by 2013
  - 1,500 mg / day by 2020
- Serious implications for food manufacturers
  - Some already have begun the process
  - Retraining of taste falling on manufacturers
Step 1 to Lowering Sodium

- Read labels! Read labels! Read labels!
- FDA allowed claims:
  - Sodium/Salt Free – <5 mg/ serving
  - Very Low Sodium – <35 mg/ serving
  - Low Sodium – ≤40 mg/ serving
  - Reduced or Less Sodium – 25% less sodium then regular version
  - Light – 50% less sodium then regular version
  - Unsalted or No Added Salt – no salt added to product during processing

Strategies to Lowering Sodium

- Small incremental changes
- Reduce portion size, reduce sodium
- Change format, reduce sodium
  - Frozen vs. canned
  - Fresh vs. other
- Recipe renovation
- Increase potassium (and calcium)!

Things That Count Up

- Eat more fruits and vegetables to increase potassium
- Replace salt with herbs & spices
- Watch the seasoning packets
- Rinse & drain canned foods
- Beware of condiments
- Know your food choices – some of the biggest contributors of sodium do not taste salty at all!

Iodized Salt

- Not all salts are iodized
  - Sea Salt, Kosher, Specialty
- Iodine deficiency is common worldwide
  - Deficiency in pregnancy is #1 cause of preventable mental retardation
  - Deficiency impairs thyroid function
  - Good sources: seafood, milk, egg yolk
  - Consider supplementation

To Conclude

- Salt has many purposes in society besides the uses in food.
- The prevalence of salt/sodium in foods has become too great?
- The preference for “salt taste” can be reduced.
- Reducing the American penchant for salt will take time.
- Whether by regulation, policy, or guidelines – change will continue to come.
- Now is a good time to begin reducing the use of salt/sodium through food choice.

Idea & Information Resources

Salt Institute
www.saltinstitute.org

American Heart Association
www.heart.org

Nutrition411
www.Nutrition411.com

Academy of Nutrition and Dietetics
www.eatright.org

International Food Information Council
www.ific.org
Thank you for participating in today’s session!

This presentation is intended to provide general information about sodium but is not intended to provide medical advice.

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Your Special Diet Partner

POST TEST

Question 1

Salt and sodium are the same thing.

A. True
B. False

Question 2

Salt is important to many aspects of living including manufacturing and food processing. Which of the following are key specifically to food processing and preservation:

A. Inhibits food spoilage
B. Adds texture to some processed foods
C. Enhances flavors in food
D. All of the above

Question 3

As people age, the sense of tasting salt

A. Increases
B. Decreases
C. Is not affected

References

- American Heart Association
- Institute of Medicine Strategies to reduce sodium intake in the United States. Report Brief April 2010
- International Food Information Council. IFIC Review Sodium in Health April 2010
Question 4
Approximately what percent of sodium in the diet comes from processed foods?

A. 6%
B. 12%
C. 77%
D. 100%

Question 5
Sodium has significant implications for which of the following health concerns?

A. Cancer
B. Diabetes
C. Failure to thrive
D. Hypertension

Question 6
Sodium is a main contributor to high blood pressure that leads to heart disease and is currently the #1 attributable risk for death worldwide?

A. True
B. False

Question 7
Many possibilities exist for lowering sodium in the diet. List at least five.

1. 
2. 
3. 
4. 
5. 

Quiz Answers
1. False. While the terms salt & sodium are used interchangeably sodium is actually a component of salt which is 40% sodium & 60% chloride.
2. D. All the responses are true.
3. B. The ability to sense the salt taste declines with each decade after 60.
4. C. 77% of sodium in the diet comes from processed foods.
5. D. Hypertension can be attributed to a high sodium intake.
6. True. High blood pressure and hypertension have become a serious public health concern.
7. Possible answers include:
   - read label for sodium and select the lower sodium products
   - reduce portion size
   - season with herbs
   - season with spices other than salt
   - use more fresh foods
   - reduce amount of seasoning packets
   - renovate recipes
   - limit condiment portions
   - rinse canned foods