The Role of Dairy and Dairy Nutrients in Promoting the Benefits of DASH
The DASH Eating Plan
Why DASH?
Dietary Approaches to Stop Hypertension

• Research has shown that the DASH Eating Plan can lower blood pressure.
Why DASH?

“If uncontrolled, hypertension can lead to coronary heart disease, stroke, cardiac failure, or kidney failure”
Goal:
Hypertension from 28% to 16% of adults.

DASH: Recommended by

National Heart, Lung and Blood Institute

American Heart Association

American Academy of Pediatrics

Dietary Guidelines for Americans 2005

eat right American Dietetic Association

NMA Since 1895

© National Dairy Council 2010®
Permission is granted to health professionals to reproduce for nonprofit educational purposes.
DASH Eating Plan Basics
DASH Eating Plan

• Emphasizes nutrient-rich low-fat dairy products, fruits and vegetables
• Consistent with the 2005 Dietary Guidelines
• Provides nutrients of concern: calcium, potassium, fiber and magnesium, as well as vitamins A, C and E.
• Positive approach - focused on what to include, not what to avoid
DASH Eating Plan  
*based on a 2,000 calorie diet*

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Daily Servings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains</td>
<td>6-8</td>
</tr>
<tr>
<td>Vegetables</td>
<td>4-5</td>
</tr>
<tr>
<td>Fruits</td>
<td>4-5</td>
</tr>
<tr>
<td>Low-fat or fat-free dairy products</td>
<td>2-3</td>
</tr>
<tr>
<td>Meats, poultry, fish</td>
<td>6 or less</td>
</tr>
<tr>
<td>Nuts, seeds, dry beans and peas</td>
<td>4-5/week</td>
</tr>
<tr>
<td>Fats and oils</td>
<td>2-3</td>
</tr>
<tr>
<td>Sweets</td>
<td>5 or less/week</td>
</tr>
</tbody>
</table>

## How Are Americans Doing?

### Fruits/Vegetables:

<table>
<thead>
<tr>
<th>Source</th>
<th>Recommendation</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>DASH trial</td>
<td>8-10 daily servings</td>
<td>3.04 daily servings</td>
</tr>
<tr>
<td>American average</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Milk Group Foods

<table>
<thead>
<tr>
<th>Source</th>
<th>Recommendation</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>DASH trial</td>
<td>3.00 daily servings</td>
<td>1.7 daily servings</td>
</tr>
<tr>
<td>American average</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Calcium Intake

<table>
<thead>
<tr>
<th>Source</th>
<th>Intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>DASH trial</td>
<td>1250mg daily</td>
</tr>
<tr>
<td>American average</td>
<td>970mg daily</td>
</tr>
</tbody>
</table>
DASH Eating Plan Benefits
Hypertension

A blood pressure reading of 140/90 mm/Hg or greater

A serious health problem among Americans with ramifications if not controlled
Who’s at Risk?

- African Americans
- Men
- Postmenopausal Women
- Overweight children & adolescents
## Prevention is Key

<table>
<thead>
<tr>
<th></th>
<th>Systolic (mm Hg)</th>
<th>Diastolic (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Normal</strong></td>
<td>&lt;120 and</td>
<td>&lt;80</td>
</tr>
<tr>
<td><strong>Prehypertension</strong></td>
<td>120-139</td>
<td>80-89</td>
</tr>
<tr>
<td><strong>Hypertension</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage 1</td>
<td>140-159 or</td>
<td>90-99</td>
</tr>
<tr>
<td>Stage 2</td>
<td>≥160</td>
<td>≥100</td>
</tr>
</tbody>
</table>

JNC VII, Hypertension. 2003; 42:1206-1252
What the Research Says
DASH: Central to Prevention

• Landmark study shows the DASH eating plan can help reduce blood pressure
• In mild hypertension, DASH can be as effective as a single antihypertensive medication

DASH Trial

- **N = 459 adults**
- **49% women**
- **60% African Americans**
- **Systolic < 160 mm Hg**
- **Diastolic 80 – 95 mm Hg**
DASH Study Design

• 3-week run-in on control diet
• 8-week randomization to one of three diets:
  – Control
  – Fruits and vegetables
  – Combination: fruits, vegetables and low fat dairy products
• Energy intake adjusted to ensure constant weight
• Sodium content of all three diets was approximately 3000 mg/daily
Results: Combination Diet with Low-fat Dairy = Greatest Blood Pressure Reduction

• Quick and lasting results with BP reduction within 2 weeks and sustained for 6 more weeks
• Decreased blood pressure more than other diets
Results:
Combination Diet with Low-fat Dairy = Greatest Blood Pressure Reduction

• Results rival medications
  – Stage 1 hypertensives, blood pressure fell as much as with single drug therapy
• Effect independent of sodium intake / weight status
• Hypertensives more than normotensives
  – African-Americans with hypertension benefit the most
DASH: Mean Diastolic BP

![Graph showing mean diastolic BP over intervention weeks for Control, F & V, and Combo groups.](image-url)

- **Diastolic BP (mm Hg)**
- **Intervention Week**
- **Control**
- **F & V**
- **Combo**
**DASH Sodium Trial**

- **N = 412 adults**
  - 57% women
  - 57% African Americans
- **Control Diet vs. DASH Combination Diet**
- **Sodium level (30 days each)**
  - High (3,300 mg)
  - Medium (2,400 mg)
  - Low (1,500 mg)

Results:
Reduced Blood Pressure at All Sodium Levels

- Largest reduction at low sodium level
- Total group: Systolic/Diastolic ↓ 8.9/4.5 mm Hg
- Hypertensives: Systolic ↓ 11.5 mm Hg
- African American hypertensives: Systolic ↓ 12.6 mm Hg
DASH Sodium Trial

Systolic Blood Pressure (mmHg)

High 3300
Intermediate 2400
Low 1500

Sodium Levels (mgNa)

Control
DASH

© National Dairy Council 2010®
Permission is granted to health professionals to reproduce for nonprofit educational purposes.
Acceptability of the DASH-Sodium Eating Plan

- Acceptability of DASH eating plan (with fruits, vegetables, low-fat dairy products) 15% higher than control diet at all sodium levels

- Intermediate sodium level (2,300 mg/d) received highest acceptability ratings overall

- African-Americans found control diet more acceptable; lowest sodium level least acceptable
Low Sodium: Tough to Achieve

- Average American sodium intake = 3,436 mg daily
- Current Dietary Guideline = 2,400 mg daily
  - Average American would need to decrease sodium intake more than 30% to meet recommendation
- Lowest DASH sodium level = 1,500 mg daily
  - To achieve the average American would need to reduce sodium intake more than 50%
PREMIER Trial

• First trial to implement DASH in free-living persons

• 810 adults with above optimal blood pressure randomized to:
  – Advice only
  – Established blood pressure interventions (weight loss, sodium reduction, increased physical activity, limited alcohol)
  – Established + DASH
Results:

**EST + DASH Most Effective**

- EST + DASH had greatest reduction in blood pressure

- Additional Benefits of EST + DASH:
  - Enhanced insulin sensitivity
  - Reduced risk factors in those with metabolic syndrome
  - Decreased waist circumference and BMI
  - Enhanced nutrient intakes

1 PREMIER, JAMA, 2003
2 Ard, et al., Diab Care, 2004
3 Lien, et al., Hypertension, 2007
5 Lin, et al., JADA, 2007
DASH Significantly Reduces Blood Pressure Over Low-Fat Diet

- 12-week clinical trial in 54 free-living overweight/obese men
- Randomly assigned low-fat diet or DASH
- Both groups had comparable weight loss
- DASH group had significantly greater reductions in systolic and diastolic blood pressure – attributed to higher dairy intake, and higher intakes of calcium and potassium

Heart Health and Stroke

Coronary Heart Disease (CHD)
16 million Americans in 2005

Stroke:
5.8 million Americans in 2005

DASH Associated with Lower CHD and Stroke Risk

88,000 female nurses in Nurses Health Study

Subjects with greatest adherence to DASH:

- 24% risk for both fatal and non-fatal CHD
- 18% risk for stroke

Fung TT, et al., Arch Intern Med, 2008
DASH eating plan may reduce risk for heart disease by lowering abnormally high blood levels of the amino acid homocysteine.

High homocysteine levels are associated with increased risk for heart disease and stroke.

**Effect may be caused by vitamin B-rich dairy, fruits, vegetables.**

Lowering homocysteine with DASH may reduce heart disease by an additional 7% – 9% on top of the 15-27% reduction in heart disease and stroke (due to decreases in blood pressure).
DASH Promotes Heart Health

Subjects following DASH diet:

- Total cholesterol 13.7 mg/dL
- LDL cholesterol 10.7 mg/dL
- HDL cholesterol 3.7 mg/dL

DASH Reduces CHD Risk Factors

The DEW-IT Trial

• 44 randomized subjects
• Half received lifestyle modifications
  – Reduced calorie DASH diet
  – Exercise
  – Reduced sodium intake

Blood pressure

Weight an average of 11 lbs.

Cholesterol

Miller, et al., Hypertension, 2002
Metabolic Syndrome

Metabolic syndrome is characterized by a group of metabolic risk factors, including:

- High LDL cholesterol
- High triglycerides
- Low HDL cholesterol
- Elevated blood pressure
- Abdominal obesity
- Insulin resistance or glucose intolerance

Effects an estimated 50 million Americans
DASH Reduces Risk Factors in Subjects with Metabolic Syndrome

In subjects with metabolic syndrome:

• Increased HDL
• Lower triglycerides
• Lower BP
• Weight loss
• Reduced fasting blood glucose

Azadbakht et al., *Diabetes Care*, 2005
Bone Health

According to the National Osteoporosis Foundation:

• Osteoporosis is a major public health threat for an estimated 44 million Americans (age 55 and older).
• In the U.S. today, 10 million individuals are estimated to already have the disease, 34 million more may have low bone mass, placing them at increased risk for osteoporosis.
• While osteoporosis is often thought of as an older person's disease, it can strike at any age.
DASH Promotes Bone Health

- DASH diet significantly reduced bone turnover
- *Positive effect of DASH on bone turnover likely resulted from many factors, including higher calcium, potassium and magnesium intake*
- Long term clinical trials needed to confirm the benefits of DASH on bone health

Lin et al., *J Nutr*, 133: 3130, 2003
Summary: Reduce Risk with DASH

• Research suggests DASH eating plan may:
  – Reduce risk of CHD and stroke
  – Reduce blood pressure
  – Reduce cholesterol levels
  – Reduce homocysteine levels
  – Support weight loss
  – Cut risk factors in metabolic syndrome

• Improves bone metabolism
Focus

African Americans and the DASH Eating Plan
African-Americans: Increased Risk Factors Compared to Caucasians

• Higher Incidences of Hypertension¹
• Higher Incidences of Overweight or Obesity in Women¹
• Higher Rates of Diabetes¹
• Lower Calcium/Dairy Intake²

¹American Heart Association, African Americans and Cardiovascular Disease Statistics Fact Sheet, 2008 Update
²What We Eat in America, NHANES 2005-2006: Usual Nutrient Intakes from Food Compared to Dietary Reference Intakes;http://www.ars.usda.gov/foodsurvey
African Americans See Greater Benefit from DASH Eating Plan

DASH eating plan is twice as effective at lowering systolic blood pressure among African-Americans as in Caucasians.

Systolic Blood Pressure

<table>
<thead>
<tr>
<th></th>
<th>Black (Normotensive)</th>
<th>Black (Hypertensive)</th>
<th>Non-Hispanic White (Normotensive)</th>
<th>Non-Hispanic White (Hypertensive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net BP Reduction, mm Hg</td>
<td>4</td>
<td>14</td>
<td>6</td>
<td>10</td>
</tr>
</tbody>
</table>

Similar Pattern in Diastolic

Diastolic Blood Pressure

Net BP Reduction, mm Hg

- Black
- Non-Hispanic White

Focus

Children, Adolescents and the DASH Eating Plan
Children May Benefit from DASH Eating Plan

- Children who consistently eat more low-fat dairy, fruits and vegetables have lower systolic blood pressure in early adolescence.

DASH Helps Manage Hypertension in Adolescents

• DASH-type diet more effective than routine out-patient care at improving systolic blood pressure and diet quality in adolescents with elevated blood pressure.

Encourages the DASH eating plan as one of the lifestyle modifications to help prevent and control high blood pressure in children.
“Although there are no comparable clinical trial data in children, there is no reason to suspect that the DASH diet would not be safe to implement in older children and adolescents as long as protein and calorie needs are met.”
Dairy’s Role in DASH Eating Plan
DASH: Core to Prevention

- Lose weight
- Increase physical activity
- Limit alcohol
- Dietary changes consistent with DASH eating plan
Dairy and the DASH Eating Plan

• Consume a diet rich in fruits, vegetables and low-fat milk and milk products
  – *Low-fat and fat-free milk and yogurt, and reduced-fat cheese*

• Reduce sodium, saturated fat, cholesterol

• Consume adequate calcium, potassium, magnesium
Dairy: A Top Source of Nutrients in DASH Eating Plan

Lin, et al., JADA, 2003
Important for Parents and Kids

Dairy foods supply four of the seven “nutrients of concern” for which American adults have low intakes: vitamin A, calcium, magnesium and potassium.

Dairy foods supply three of the five nutrients of concern for which children have low intakes: calcium, potassium, and magnesium.

---

Doing DASH

Find the following educational resources, tips and recipes on www.nationaldairycouncil.org/dash
Patient Education Resources

DASH* FACS

DASH APPROACHES TO STOP HYPERTENSION

Hypertension, or high blood pressure, is a major risk factor for heart disease and stroke. You could be at risk for high blood pressure if you have excess body weight, inadequate intake of fruits, vegetables, low-fat milk, fish, and other fat-free or low-fat milk products. Drink too much alcohol and have hypertension. Seek help from your physician and dietitian to manage these risk factors and find a plan that's right for you. The DASH concept may be part of that plan.

The DASH eating plan is the DASH eating plan in its low-fat form. It includes a plan rich in vegetables, fruits, and low-fat milk. It includes foods to help you reach your target blood pressure level. The DASH eating plan in its low-fat form may help you reach your target blood pressure level.

Tips for Success:

- Start with a DASH breakfast to get a good start on your day. Add a banana, a piece of fruit, and whole grain bread.
- Choose "modified foods" like full-fat yogurt mixed with fruit and topped with granola.
- Sip that dark, dark beverage of choice.
- For those with active lifestyles, try yeast-free or yeast-reduced breads, such as Whitefish, or yeast-kneaded breads like whole wheat or whole grain breads.

*The DASH eating plan includes a modified eating plan that is low in sodium and low in fat. It is designed to help reduce blood pressure and improve cholesterol levels. This eating plan includes a variety of lean meats, fish, poultry, and low-fat dairy products. It also includes a variety of fruits and vegetables, whole grains, and a variety of fiber-rich grains. It is a healthy eating plan that is designed to be enjoyed by people of all ages. It is a good eating plan for people who need to lose weight or lower their blood pressure. It is a good eating plan for people who need to lower their cholesterol levels. It is a good eating plan for people who need to lower their blood pressure and improve their overall health.
Advertorials

More than 40% of African Americans have high blood pressure.1

The solution could be behind door #2.

Talk with your patients about DASH.

Foods Emphasized in the DASH Eating Plan

- LOW-FAT or FAT-FREE MILK, yogurt or reduced-fat cheese
- FRUITS
- VEGETABLES
- WHOLE GRAINS

Lifestyle changes, including diet, are an important part of any plan to achieve and maintain a healthy blood pressure. In fact, the DASH (Dietary Approaches to Stop Hypertension) Eating Plan is recommended to both prevent and control high blood pressure.

The low-fat dairy-rich DASH diet was twice as effective at lowering systolic blood pressure among African-Americans as in Caucasians.2

Dairy foods were among the top food sources of calcium, potassium and magnesium in the DASH diet.3 These three nutrients play an important role in blood pressure regulation.


© National Dairy Council 2010®
Permission is granted to health professionals to reproduce for nonprofit educational purposes.
ONE IN THREE ADULTS HAVE HIGH BLOOD PRESSURE.

And they probably don’t know it.

Talk with your patients about DASH.

Lifestyle changes, including diet, are an important part of any plan to achieve and maintain a healthy blood pressure. In fact, the DASH (Dietary Approaches to Stop Hypertension) Eating Plan is recommended to both prevent and control high blood pressure.

The DASH diet may even lower blood pressure as well as the use of some medications. In those with mild hypertension, the DASH diet reduced blood pressure as much as a single antihypertensive medication.

Foods Emphasized in the DASH Eating Plan

- LOW-FAT or FAT-FREE MILK, yogurt or reduced-fat cheese
- FRUITS
- VEGETABLES
- WHOLE GRAINS

Dairy foods are among the top food sources of calcium, potassium and magnesium in the DASH diet. These three nutrients play an important role in blood pressure regulation.

For DASH recipes and examples visit http://www.dash Eating postseason/DASH.

These health and nutrition organizations support it: Every Day™ of Dairy, a science-based nutrition education program encouraging Americans to consume the recommended three daily servings of nutrient-rich low-fat or fat-free milk and milk products to improve overall health.

Advertorials

Lower blood pressure is important at any age.

Talk with parents about DASH.

With more than 15 percent of school-aged children diagnosed as overweight or obese, the risk of developing high blood pressure when they grow up increases significantly. Research has shown that children who consistently eat more servings of dairy foods, fruits and vegetables had the lowest blood pressure levels over time. Conversely, those who ate the least amount of dairy foods, fruits and vegetables had the highest blood pressure levels over time.1

The DASH (Dietary Approaches to Stop Hypertension) Eating Plan is encouraged as one of the lifestyle modifications to help prevent and control high blood pressure in children.2 A DASH-type diet, rich in fruits, vegetables, and low-fat dairy foods, was more effective than routine out-patient care at improving systolic blood pressure and diet quality in adolescents with elevated blood pressure.3

Foods emphasized in the DASH Eating Plan

- LOW-FAT or FAT-FREE MILK, yogurt or reduced-fat cheese
- FRUITS
- VEGETABLES
- WHOLE GRAINS

Visit www.crdp.org for useful tips.

References:
More Dairy DASH Facts

Nutrition Fact Sheet

Making the DASH Difference: The DASH Eating Plan Can Assist in Managing High Blood Pressure for Many People

Research supported by the National Heart, Lung and Blood Institute has shown that the DASH eating plan (Dietary Approaches to Stop Hypertension) can lower blood pressure and LDL (“bad”) cholesterol, which can reduce your risk for heart disease. This heart-healthy eating plan also provides nutrients that are in short supply in many Americans’ diets.

The DASH eating plan is one example of an eating plan that incorporates the recommendations of the Dietary Guidelines for Americans. The DASH eating plan emphasizes consuming low-fat and fat-free milk and milk products, nuts and vegetables and encourages the consumption of whole grain foods. These foods provide calcium, potassium, fiber, and magnesium—important nutrients for managing blood pressure—as well as vitamins A, C, and E. Many Americans need to increase their intake of these nutrients.

Simple Tips to DASH Your Diet

Start at Breakfast:
Get ahead of the game and start your day with a whole grain cereal, fruit, and low-fat milk or yogurt.

Re-think Your Drinks:
Make low-fat and fat-free milk your beverage of choice. Serve low-fat white or flavored milk at meals. Choose a dairy-free milk, such as soy or rice milk, or a fat-free, low-calorie, no-sugar-added beverage.

More Dairy DASH Facts

- **Make it mild:** Use low-fat milk, plain yogurt, or a banana smoothie when making a smoothie or a banana milkshake.
- **Throw a party:** Have fun with friends or family by making a healthy milk bar with fresh fruit and yogurt.
- **Share a bowl:** Share a bowl of low-fat yogurt with friends and family.
- **Pour it on:** Pour low-fat milk on top of your favorite cereal.
- **Pour it on:** Pour low-fat milk on top of your favorite cereal.

More Dairy DASH Facts

- **Make it mild:** Use low-fat milk, plain yogurt, or a banana smoothie when making a smoothie or a banana milkshake.
- **Throw a party:** Have fun with friends or family by making a healthy milk bar with fresh fruit and yogurt.
- **Share a bowl:** Share a bowl of low-fat yogurt with friends and family.
- **Pour it on:** Pour low-fat milk on top of your favorite cereal.
- **Pour it on:** Pour low-fat milk on top of your favorite cereal.

Sample DASH Menu

**Breakfast**
- Whole grain cereal
- Low-fat milk
- Fresh fruit
- Yogurt

**Lunch**
- Whole grain bread
- Low-fat cheese
- Green salad

For a referral to a registered dietitian and for additional food and nutrition information, visit the National Dairy Council website: www.nationaldairy.com

© National Dairy Council 2010
Permission is granted to health professionals to reproduce for nonprofit educational purposes.
Top Ten Tips

1. Start with Breakfast

Get ahead of the game and start your day with a whole grain cereal, fruit and low-fat milk or yogurt.
Top Ten Tips

2. Rethink your drink

Make low-fat and fat-free milk your beverage of choice.

Serve low-fat plain or flavored milk at meals.

Choose a skinny latte or milk steamer.
3. Get Veggies

Try new vegetables by serving them raw with low-fat yogurt dip, topping them with cheese or adding them to recipes.
Top Ten Tips

4. Mix it up

Make pizza with reduced-fat cheese and vegetables.

Create a baked potato bar with vegetables for topping, beans, salsa, and cheese.

Sprinkle cheese on top of soups and casseroles.
Top Ten Tips

5. Add fruit

Create a fruit smoothie or liquado with low-fat milk, yogurt and fresh fruit chunks.

Serve a platter of roasted nuts, pretzels, fruits and vegetables served with low-fat yogurt dip.

Create fruit and cheese kabobs.
Top Ten Tips

6. Nourish your sweet tooth

Try low-fat chocolate milk for a nutrient-rich beverage break.

Feed your cravings with fresh or dried fruits or fruit filled gelatin.

Layer low-fat yogurt with granola and/or fruit for a sweet treat.
Top Ten Tips

7. Make substitutions

Use low-fat milk in place of water when cooking, especially with oatmeal, brown rice and whole-grain pasta dishes.
Top Ten Tips

8. Super soups

Prepare soups with low-fat milk instead of water.
Add extra fresh, canned or frozen vegetables to prepared soups.
9. DASH on the go

Enjoy portable dairy products such as string cheese, yogurt smoothies or milk in chug-style single serve resealable containers, when you need to “dash” around on the go.

They can be easily consumed in the car, at the office or on the road.
Encourage kids to make nutrient-rich choices at school, such as low-fat plain or flavored milk, apples or carrots instead of chips, and yogurt for dessert.
Recipes

• www.nationaldairycouncil.org

• www.nhlbi.nih.gov/health/public/heart/hbp/dash/recipes.html
Additional DASH Resources

National Heart, Lung and Blood Institute:
www.nhlbi.nih.gov

American Heart Association:
www.americanheart.org

American Dietetic Association:
www.eatright.org
Insert Local Dairy Council
Contact Info

Your Connection to Dairy Nutrition Expertise, Information and Resources