Nutrition and Asthma

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Nutrition and Asthma

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The meaning of Nutrition

- Nutrition is part of our environment and is a reflection of our:
  - Cultures
  - Available Choices
  - Income
  - Wellbeing

Nutrition Basics

The Foods we eat have 4 functions

- Body Building
- Regulation
- Protection
- Fuel

Body Building Foods

- Proteins:
  - Meat
  - Fish
  - Poultry
  - Eggs
  - Milk based foods
  - Beans and Seeds
  - Nuts
- Minerals:
  - Calcium
  - Iron
  - Zinc
  - Magnesium
- Fats:
  - Fats from Animal and Plant foods

Regulation

- Proteins for:
  - Insulin
  - Thyroid Hormone
  - Neurotransmitters
  - Enzymes
    - Digestion
    - Energy production, homeostasis
- Vitamins and Minerals help these work
- Cholesterol for:
  - Steroid Hormones
    - Cortisone
    - Sex Hormones
    - Vitamin D

Protective Foods

- Vitamins and Minerals found in:
  - Fruits and Vegetables
    - Vitamin C
    - Carotenes
    - Flavonoids
    - Folic Acid
    - Magnesium
  - Protein Foods
    - Zinc
    - Iron

Fuel

- All Foods that contain calories
  - Proteins
  - Carbohydrates
  - Fats

  Needed for growth, tissue repair, activity and temperature regulation

Nutrition and Asthma

Increase resistance to:

- Environmental Insults
  - Dust
  - Air Pollution
  - Dust Mites
  - Allergens
- Infections

Impact of Household Chemicals

Toxic non-food household products:

- Detergents
- Cleaning Products
- Aerosols (deodorizers, hair spray)
- Pesticides
- Cosmetics
- Treatments for head lice

Some Dietary Risk Factors for Asthma

- Food Allergies
- Risk Factors for allergies
  - Little to no breastfeeding
  - Early introduction to solid foods
- Diets low in fruits and vegetables
- Sulfites
  - Dried fruits
  - Grape juice, beer, wine

Asthma and Overweight

- Dietary Habits that lead to overweight increase risk of asthma
  - High Soda Intakes
  - Commercial Fast Foods
- Decreased Physical Activity can both cause and result from overweight
  - Can lead to decreased respiratory capacity

Today We Eat More

- Fruit juices
- Sodas
- Turkey and chicken meat
- Grains
- Margarine and Vegetable Shortening
- Foods fried in these
- Vegetable Oils
- Canned fruits and vegetables
- Muscle Meats

Today We Eat Less

- *Eggs* (rich in vitamins A, D and omega 3)
- *Fatty Fish* (sardines, herring, mackerel)
- *Pork meat*
- Fresh Fruits and Vegetables
- Butter, Coconut and Olive Oil

Foods in italics have omega 3 fats in them

- *Flaxseed*
- *Nuts* (rich in copper, selenium, zinc)
- *Shellfish* (rich in minerals)
- Whole animals in soups and stews
- Vital Organs (vitamins A, D, B's, minerals)

Poor Overall Diet Quality

- High Intakes of Sugars
- Allergenic Foods

Fats: What We Do Now

- We eat more omega 6 fats and less omega 3 fats
- We eat trans fats
- Some Research suggest this may lead to:
  - Inflammation
  - Depressed Immunity
  - Asthma
  - Airway Reactivity

Sources of *Trans* Fats

Cookies, crackers, baked goods, bread, etc.

Chips, snack foods

Fried foods

Choosing Quality Fats

- These are fats used for thousands of years to support health and cultures
  - Butter
  - Olive Oil
  - Coconut and Palm oils
  - Peanut and nut oils
  - Fats in food (fish, meat, poultry)

What Saturated Fats Do

- These fats are found in our brains and bodies and are preferred structural fats
- Enhance calcium retention in the bone
- Help retain omega 3 fats in the tissues
- Protect the liver from alcohol and Tylenol
- Are preferred food to the heart muscle
- Essential to lung surfactant

Essential Fats Needs

- Possible symptoms of lack of omega 3 and omega 6:
  - Dry skin and hair
  - Frequent urination
  - Excessive thirst
- Omega 3 requirements can be increased by:
  - Cold weather
  - Chronic or acute stress
  - High intakes of omega 6 fats or trans fatty acids

Possible Benefits of Omega 3 Fats

- Regular oily fish intake results in one third the risk of asthma in children (2)
- A 1:2 ratio of omega 3 to omega 6 fats resulted in improvement of asthmatic symptoms vs feeding a 1:10 ratio (3)
- Increased omega 6 to omega 3 ratio associated with more asthma (30)

How to get Omega-3 from our Foods

- Wild Game
- Pastured Animals
- Fatty Fish
  - Salmon (Wild not farmed)
  - Mackerel
  - Herring
  - Atlantic Cod
  - Canned Tuna or Salmon
- Omega-3 enriched eggs
- Vegetarian Sources
  - Flaxseed oil or meal
  - Walnuts
  - Purslane (Verdolagas)
  - Chia
  - Perilla oil

Getting the Most from Fats

- Get rid of trans fats
  - Margarine
  - Vegetable Shortening
  - Commercial Baked Goods and Fast Foods
- Use butter instead of margarine
- Cook in Olive, rice bran or sesame oils
- Use less corn, safflower, sunflower and soy oil
- Use coconut oil
- Enjoy flaxseed oil and have fatty fish 2 times a week

Supplements and Asthma

- Vitamin C
- Magnesium
- B-6 or Pyridoxine
- Vitamin D
- Vitamin E
- Probiotics

Functions of Vitamin C

- Helps make connective Tissue
- Is Concentrated in Healthy Adrenals
- Is Found in the Airway Surface Liquid of the Lung (4)
- Inhibits phosphodiesterase like theophylline does (5)
- Vitamin C destroys histamine (6)

Vitamin C Benefits

- Antihistamine
- Antioxidant
- Anti-inflammatory
- Widely distributed in foods (citrus, kiwi, hot and sweet peppers, leafy greens, berries and cabbage family vegetables)

Vitamin C in Asthma

Some studies which suggest a role for Vitamin C

- Asthmatic Children have < Vitamin C in their blood (7)
- Low intakes of Vitamin C > bronchial reactivity (8)
- Higher intakes of vitamin C are associated with increased Forced Expiratory Volume (9, 10)
- Supplemental vitamin C (1 gram per day) found a 73% reduction in number of asthma attacks (11)
- Supplemental C decreased the tendency of bronchial passages to go into spasm (12)

Why we may need Vitamin C supplements

- Vitamin C is needed to form connective tissue (in the lining of blood vessels)
- Vitamin C is needed for the activity of the rate limiting enzyme needed to convert blood cholesterol to bile
- The higher the Vitamin C blood levels the less mortality from all causes including heart disease

Why we may need Vitamin C supplements

- Vitamin C is made in the liver of most animals except humans, guinea pigs and some fruit eating bats
- The amount of vitamin C made by human sized animals (150 lb. goat) is 3000 to 10,000 mg per day
- This amount increases when the animal is stressed or fighting infection

Functions of Magnesium

- Need balance between Calcium and Magnesium intakes
- Calcium helps release histamine and acetylcholine and contract smooth muscle.
- Magnesium inhibits smooth muscle contraction by inhibiting entrance of calcium into smooth muscle cell.

Functions of Magnesium

- Too much calcium relative to magnesium will favor contraction of the bronchioles
- In over 2600 adults a higher intake of magnesium was associated with better lung function and decreased wheezing (14)
- Can find lower levels of magnesium in the serum or red blood cells of asthmatics (15)
- Serum levels may remain normal, while cell magnesium content is depleted (15)

Benefits of Magnesium

- IV Infusions of magnesium sulfate produce effects comparable to those of bronchiodilating drugs (16)
- MgSO4 has been helpful in the management of acute respiratory failure, even when aggressive standard treatment had failed (17, 18)
- Magnesium can be administered orally in dosages of 6.2 mg per pound of body weight (19, 20)

Benefits of Magnesium

- Should be tailored to the size of the person, since magnesium is a laxative
- The dose should be divided and taken with meals to reduce the laxative effect

Pyridoxine or Vitamin B-6

- Helps in the metabolism of protein
- Deficiency depresses immunity
- Depleted by pollutant exposure (21)
- Lower levels in Asthmatic Children (22)
- Depleted by theophylline and aminophylline (23)

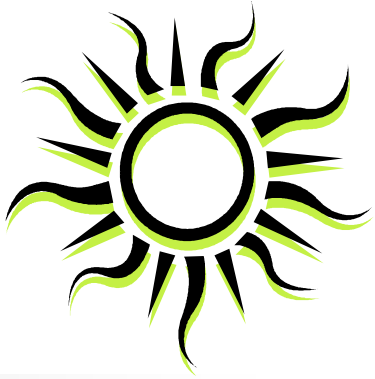
Vitamin B-6 and Asthma

Some studies which suggest a role for B-6

- 200 mg of B-6 resulted in less asthma symptoms and attacks vs. placebo (24)

- 50 mg two times a day decreased severity and frequency of asthma attacks (25)

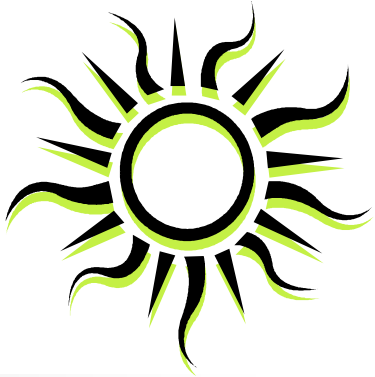
Vitamin D Functions



Roles:

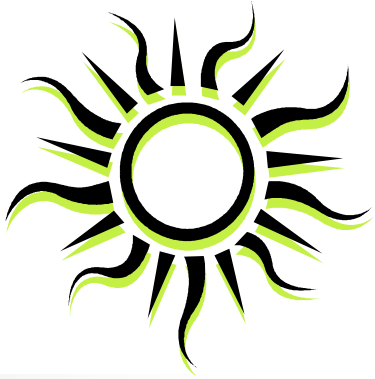
- Calcium and magnesium absorption and retention
  - Bone Health
  - Teeth Health
  - Muscle Contraction and Relaxation
  - Osteoporosis Prevention and Reversal

Vitamin D Relationship to Disease



- Prevents and slows progression of:
  - Arthritis (osteo and rheumatoid)
  - Cancer (prostate, colon and breast)
  - Diabetes I and II
  - Heart Disease
  - Inflammatory Bowel Disease
  - Asthma?
  - Lupus
  - Fibromyalgia
  - Multiple Sclerosis
  - Myopathy (muscle damage)
  - Sarcopenia (muscle weakness)
  - Tuberculosis

How much do we need?



This will depend on:

Exposure to sunlight

Pigmentation

Health Status

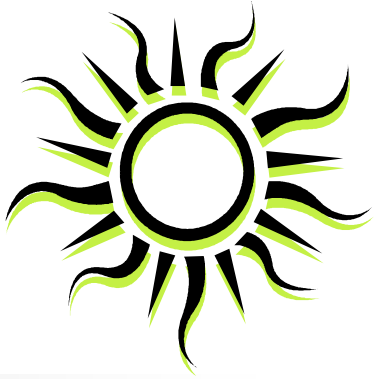
Age

- **Intakes of over 2000 IU have been safe in many studies (26)**

The current RDA* are:

- Infants - 200 IU
- Children 200 IU
- Women – 200 IU
- Adult Men – 200 IU
- Seniors – 400-600 IU

Vitamin D
Factors affect formation



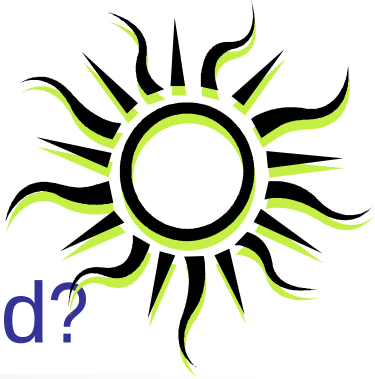
Major Source: Sun rays

Factors that lower Vitamin D production…

- Dark skin color (melanin)
- Aging
- Housebound
- Risk of Melanoma
- Clothing
- Geography

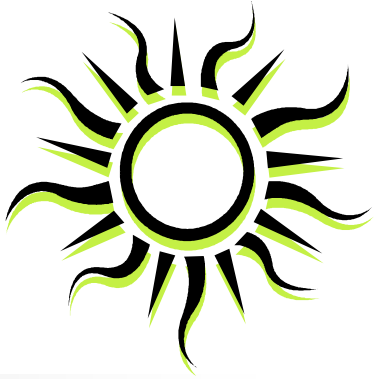
Vitamin D

How do we know if more is needed?



- Do blood test called:
  - 25 Hydroxy Cholecalciferol or Vitamin D
- What is a good level?
  - More than 50 nanograms per mililiter
  - Less than 30 nanograms per mililiter is considered deficient

Vitamin D Assessment and Follow Up



- Recommendations
  - Test for Vitamin D levels
  - If low, recommend increase in intake and/or sun exposure, according to their sun tolerance
  - Retest in six months to see how they are doing.
  - Modify intake according to results

Vitamin D and Asthma

Some studies suggest a role for Vitamin D

- Increasing Vitamin D in pregnancy associated with less wheezing in offspring (27)
- Vitamin D insufficiency in children associated with asthma severity (32)
- Serum 25(OH)D levels are inversely associated with recent URTI. This association may be stronger in those with respiratory tract diseases. (35)

Why we may need vitamin E supplements

- Richest Natural Source is Wheat Germ Oil – 37 IU per Tablespoon
- 400 IU = 11 T. or 1375 calories
- Destroyed by free radicals
- High fat diets increase requirement
- Neutralizes bad effects of fast food meals

Vitamin E and Asthma

Some studies suggest a role for Vitamin E

- Higher intakes of vitamin E are associated with better lung function (higher FEV and FVC). (9)
- Meta-analysis of vitamin A, E and C and Asthma found low intakes of A and C associated with increased odds and severity of asthma. Vitamin E levels were lower in severe asthmatics, but unrelated to asthma status (36)

Probiotics and Asthma

Some studies suggest a role for probiotics

- May reduce tendency to allergies and asthma in infants (28)
- Review of Randomized Controlled Trials found benefit in reducing allergic rhinitis (29)

Asthma and Diet Quality

- Kim JH, et al Diet and Asthma: Looking back, moving forward Respir Res 2009 Jun 12; 10:49. (33)
- Litonjua AA Dietary Factors and the Development of Asthma Immunol Allergy Clin North Am. 2008 Aug;28(3):603-29, ix (34)

Dietary Recommendations 1

- Encourage families to eat more:
  - Fruits and Vegetables
  - Better Quality Fats
  - Quality Protein (Animal and Vegetable)
  - Eggs

Dietary Recommendations 2

- Encourage families to eat less:
  - Sodas and Fruit Juices
  - Commercial Fast Foods
  - Snacks high in sugar, fat and salt
  - Avoid Sulfites
  - Avoid Hydrogenated Fats
    - Margarine
    - Vegetable Shortening

Activity Recommendations

- Encourage families to move more:
  - Be active as a family
  - Walk
  - Dance
  - Play in parks (when possible)
  - Be in nature (when possible)

Next Steps

- Can this information help your families?
- What take home messages have you gotten from today?
- What changes would you recommend they make to support better health?
- What are some things that can be done to better communicate these ideas?

Conclusions

- We need to come together to figure out
  - What information needs to be shared
  - How best to share it
  - How to improve our communities
    - Housing
    - Living Conditions
    - Environment
  - How to make health a front and center political and funding priority