

# Fact and Fiction in Nutrition and Agriculture

## Outline

- The science of nutrition
- Organic and conventional produce\*
- High fructose corn syrup
- Gluten

\*modified from SNE presentation, 2012  
Carl L. Keen and Marilyn Dolan

# Changing Expectations of a Healthy Diet

**Prevention of essential nutrient deficiencies**

**Reduction in the onset/progression of select cancers**

**Reduction in the onset/progression of age-related diseases**

**Improvements in endurance capacity and mental health**

**Reduction in the occurrence of select birth defects**

**“Optimal Health”**

# Why All the Confusion and Conflict?

- The science of nutrition is constantly evolving.
- Old beliefs are discarded and advice changes as nutrition scientists conduct more research and gain greater understanding.

# Nutrition Is A Dynamic Science

- As researchers continue to explore complex relationships between diets and health, nutrition information constantly evolves.
- Even nutrition scientists and educators have difficulty keeping up with the vast amount of research published in scientific journals.

# Beyond the Hype

- Nutrition is an inter-disciplinary science
  - Read and interpret the scientific literature to help clinicians and assist consumers in making the right decisions
  - “Evidence-based” recommendations
  - Understanding these recommendations can help you differentiate the hype from the evidence-base

# Are Organic Foods Safer or Healthier Than Conventional Alternatives?



# Current Organic Legislation

- As of October 21, 2002, all foods bearing the USDA organic symbol must contain at least 95% organic ingredients.
- Currently, the USDA makes no claims that organically produced food is safer or more nutritious than conventionally produced food.
- Due to the complexity of the issue and the lack of well controlled research investigations, there is no national recommendation regarding consumption of organic foods.

# Why Do Consumers Purchase Organic Foods?

- Concerns about the effects of conventional farming practices on:
  - The environment
  - Human health
  - Animal welfare
  - Perceptions that organic foods are tastier than their conventional alternatives



# The Majority of Americans are not Meeting Current Recommendations for Fruit and Vegetable Consumption

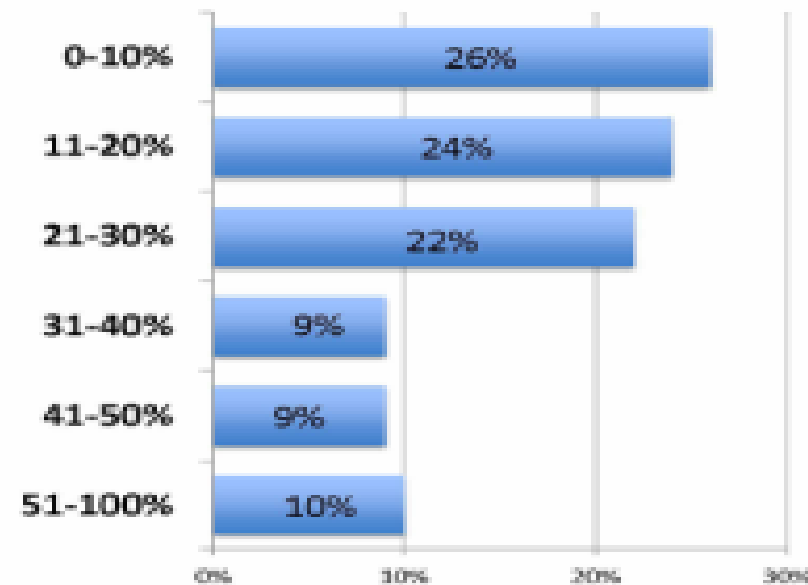


# Fewer than 20 percent of Americans are meeting USDA recommendations!



## Produce Purchases

What percentage of your typical grocery trip is comprised of fruits and vegetables? (Q.3)



**Mean:  
26.3%**

# SCARED FAT:

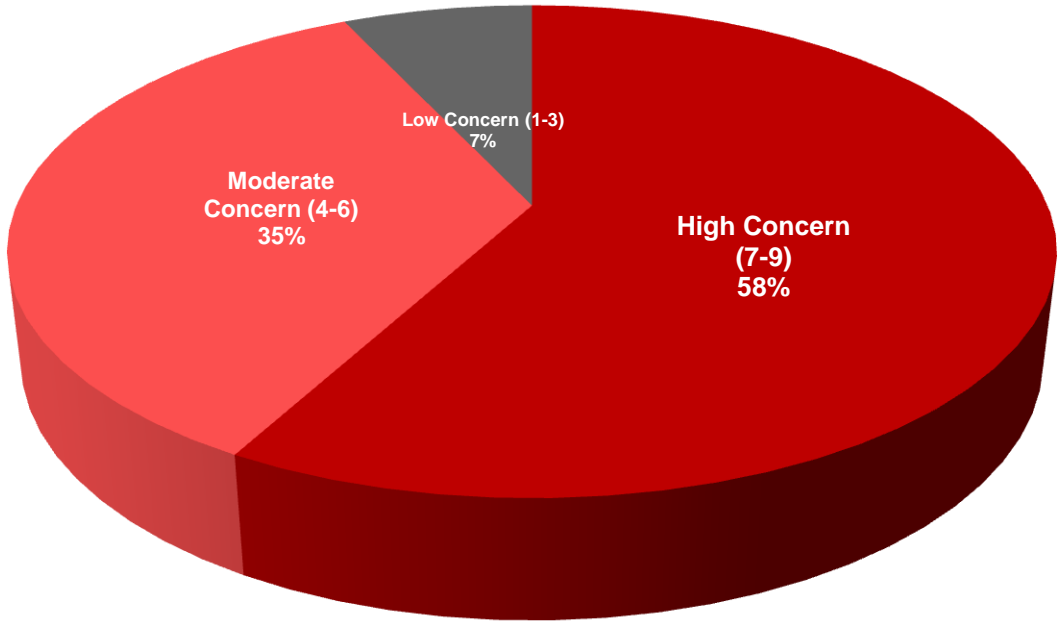


**Are Consumers Being Scared Away from Healthy Foods?**

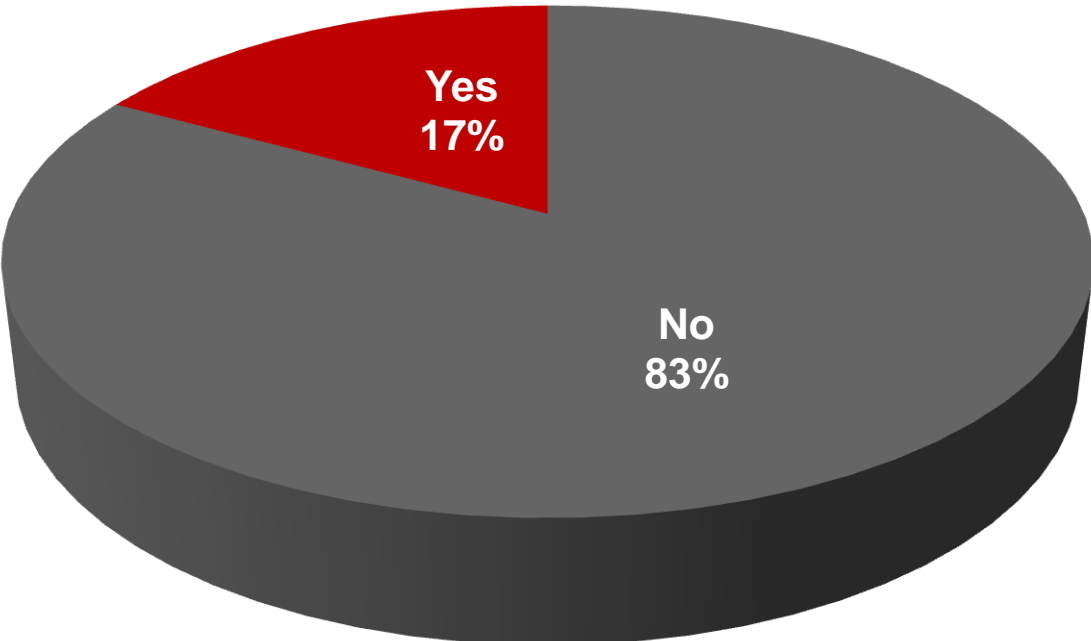
# Consumers Are Concerned About Pesticides!

## Consumer Research:

*How concerned are you about pesticide residues on fruits and vegetables?*



*Are there any fruits or vegetables you have stopped or reduced purchasing because of concerns about pesticide residues?*



*Reference: Alliance for Food and Farming 2008*

# Why the Confusion?

▶ Everyone agrees that consumers **should be eating more** fruits and vegetables.

▶ Consumer research suggest the most credible people to deliver health messages to consumers are physicians, nutritionists and dietitians.

**However, the popular media is increasingly where many get their nutritional facts**

Regrettably, increasingly negative messaging is becoming accepted as factual.

*“The growing consensus among scientists is that small doses of pesticides and other chemicals can cause lasting damage to human health, especially during fetal development and early childhood.”*

*Environmental Working Group*

# Report Findings

- ▶ Lists like “dirty dozen” can be an impediment to good health because they can discourage consumption of produce.
- ▶ The lists may mislead consumers.
- ▶ They do not provide a basis to assess risk.
- ▶ There is no scientific evidence that the levels of pesticides found on fruits and vegetables pose any human health risk.





***“Is the Produce You Eat Covered in Pesticides?”*** --Chicagoist

***“Terrifying Toxic Fruit List Will Change the Way You Eat”*** --The Stir

***“14 Pesticide-Covered Foods That Will Change The Way You Shop”***  
--Business Insider

***“Watch Out for the 2012 Dirty Dozen”***  
--CNN



# About the Alliance for Food and Farming



- ▶ Non-profit formed in 1989
- ▶ Organic and conventional farmers. ▶ Alliance contributors are farmers of fruits and vegetables; companies that sell, market or ship produce; or organizations representing farmers.
- ▶ Mission: to deliver credible information to consumers about the safety of fruits and vegetables.
- ▶ The Alliance does not engage in any lobbying activities, nor does it accept any money or support from the pesticide industry.

# SafeFruitsandVeggies.com

- ▶ Promotes consumption of all fruits and vegetables.
- ▶ Provides credible information
- ▶ Developed by experts in nutrition, toxicology, risk assessment and farming.
- ▶ Pesticide Residue Calculator
- ▶ Farmer videos
- ▶ Blog
- ▶ Scientific Reports
- ▶ Facebook, Twitter, YouTube

[www.safefruitsandveggies.com](http://www.safefruitsandveggies.com)

SafeFruitsandVeggies.com

A resource for science based information about pesticide residues.

HOME ABOUT US FAQ

RESIDUE CALCULATOR RESEARCH HEALTH & NUTRITION U.S. PRODUCE



60% of consumers express a high concern about pesticide residues, much of which is based on misleading information.

## PESTICIDE RESIDUE CALCULATOR

Scientists and health experts overwhelmingly agree that the mere presence of pesticide residues on food does not mean they are harmful.

When considering the safety of any substance, it is important to understand what is known as a "dose-response relationship." This means that almost every substance — even water or oxygen — can be toxic at some level. For every product there is a point, or a dose level, that will not produce a response in a living organism. In the world of pesticide regulation, that point is called the No Observed Adverse Effect Level.

[CLICK HERE TO CALCULATE YOUR "DOSE-RESPONSE" LEVEL.](#)



Man



Woman



Teen



Child



# Scientific Basis of the “Dirty Dozen”

- ▶ Risk = Exposure \* Toxicity
- ▶ The “Dirty Dozen” list considers **exposure**, but makes no attempt to address toxicity
- ▶ There are reliable, well-established and accepted methods for assessing the risk of small doses of chemicals.
- ▶ The authors of the “Dirty Dozen” list acknowledge this and clearly state on their website that the list “**is not built on a complex assessment of pesticide risks.**”

## SCARED FAT:



# Scared Fat?

- ▶ An Expert Panel reviewed a new nationwide study of 800 adults.
- ▶ The survey examined the potential impact of negative messages by activist groups that question the safety of fruits and vegetables.
- ▶ They considered the impact of this messaging on consumer attitudes toward buying fruits and vegetables.

# Expert Panel Conclusions

1. The survey results suggest an emerging public health threat. Negative messaging on food safety is not promoting consumption of fruits and vegetables.
2. We have an obesity epidemic. The Media/Internet may be increasing our fears about food safety, and lowering our faith in government oversight of the safety of our food.
3. It is inaccurate to suggest that organic produce is the only “safe” choice.
4. Some consumers feel like they are making inferior choices when they buy conventionally grown produce.
5. The key health message should be – eat your fruits and vegetables.

# What is the REAL Truth?

▶ Is there **scientific consensus** that the small amounts of pesticide residues reported to occur on some food sources are harmful?

▶ Is there evidence that the benefits of eating fruits and vegetables outweigh the potential risks associated with the small amounts of pesticides that might be obtained through the ingestion of these foods?

# Organic and Conventional Produce

**Whether grown organically or  
conventionally, plant foods contain:**

- Fiber
- Vitamins
- Minerals
- Phytochemicals

# Organic Advantages

**Organic plant foods may have an advantage over conventionally grown foods by:**

- **Having an increased concentration in:**
  - Vitamin C
  - Carotenoids
  - Polyphenols



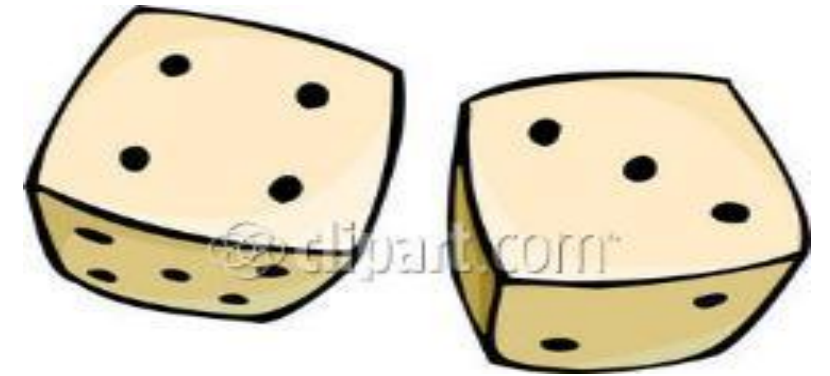
# It is Well Accepted that Fruits and Vegetables are Good For You

- ▶ No convincing evidence that pesticide residues on fruits and vegetables pose a risk to health.
- ▶ In contrast, the data on health benefits of consuming fruits and vegetables is substantial and convincing.
- ▶ Probable reductions in risk provided by diets rich in fruits and vegetables:
  - ▶ High blood pressure    ▶ Stroke    ▶ Heart disease
  - ▶ Some Cancers            ▶ Digestive problems.



# Remaining Uncertainties About Fruit and Vegetable Health Benefits

- ▶ The precise mechanisms that underlie the positive health effects of fruit and vegetables are still poorly understood and represent an area of significant research.
- ▶ Limiting one's diet to certain fruits and vegetables, and excluding others, due to fears over pesticide residues, is risky.
  - May result in individuals making questionable decisions regarding the known positive benefits of fruits and vegetables versus the theoretical negative effects of pesticide residues.



# Potential Differences in Nutritional Quality of Conventional and Organically-Grown Foods?

## ► Some recent analyses address this issue:

- Winters and Davis (2006) review for Institute of Food Technologists.
- Dangour et al. (2009) review from London School of Hygiene & Tropical Medicine.
- Smith-Spangler et. al. (2012) review from Annals of Internal Medicine

## ► Some differences are expected between conventional and organically-grown foods.

- Conventional crops have more nitrogen available, often leading to more growth.
- Organic crops are often under more stress which can result in an increased production of defensive phytochemicals in plants.
- The nutritional value of these compounds for humans is poorly understood.

# Potential Differences in Nutritional Quality of Conventional and Organically-Grown Foods?

- ▶ Important nutritional differences between conventional and organically-grown fruits and vegetables were not identified in the above studies.

# Are Organic Foods Safer or Healthier Than Conventional Alternatives?

- No differences in vitamin or mineral content between conventionally and organically grown fruits and vegetables
  - with the exception of phosphorus
- No differences in protein or fat content in milk from conventionally and organically raised animals
  - limited evidence for higher omega 3 fatty acids in milk from organically raised animals
- Pesticide levels of organic and conventional foods fell within allowable safety limits
  - lower levels of pesticide residues in urine of children consuming organic diets

# I Encourage You To . . .

- **Check out the website**

[www.safefruitsandveggies.com](http://www.safefruitsandveggies.com)

- **Sign up for the newsletter**

- **Like” the Facebook Page**

[www.facebook.com/safefruitsandveggies](http://www.facebook.com/safefruitsandveggies)

# Study: High Fructose Corn Syrup Is No Worse Than 'Real' Sugar



# “Added Sugar”

- Definition came from USDA
  - *Added sugars are sugars and syrups added to foods in processing or preparation*

- Sugar not intrinsic to the food





# Added vs. Naturally Occurring

## Added Sugars

- Added during manufacturing, cooking, at the table
- Examples:
  - Granulated or powdered sugar
  - Corn syrup
  - High-fructose corn syrup
  - Honey
  - Molasses

## Naturally Occurring Sugars

- Inherent in certain foods and beverages
- Examples:
  - Fructose in fruit
  - Lactose in milk



# High Fructose Corn Syrup

- High-fructose corn syrup is not pure fructose. There are two main types of high-fructose corn syrup that are used in foods:
- 55% fructose/ 45% glucose: this is mostly used in sugary drinks, like soda, as well as in ice cream and other frozen desserts
- 42% fructose/ 58% glucose: this is mostly used in baked goods, like cookies and crackers, and canned fruits, condiments, and dairy products

# High Fructose Corn Syrup

- Credible experts and scientific societies:
  - “There is not a metabolic difference between high fructose corn syrup and sugar”

Increased caloric intake, not a single sweetener is the likely cause of obesity

# To discern whether a new scientific study is pertinent to HFCS

- Experimental design: randomized controlled studies are the gold standard
- Subjects tested: human subjects
- Sugars compared: HFCS versus sugar is the best comparison
- Levels tested: range of fructose in diet is 5-17% of kcals
  - Be wary of studies that use exaggerated fructose levels in human (25-50% of kcals) and animals (>60% of kcals)

# Recommendations for Intake of Added Sugars

- American Heart Association
  - <150 kcals/d for men (9 tsp)
  - <100 kcals/d for women (6 tsp)
- Dietary Guidelines for Americans (2010)
  - As Solid Fats and Added Sugars (SoFAS)
    - 5-15% of total kcals

# Gluten and Celiac Disease

- Gluten is a protein found in:
  - Wheat
  - Rye
  - Barley
  - Oats
- Provides bread with elasticity and chewiness



# What is celiac disease?

- An autoimmune disorder
- Exposure to gluten results in damage to the intestinal lining
- Damage to the lining of the intestine reduces ability to digest and absorb nutrients
- Treatment consists of completely eliminating gluten from the diet

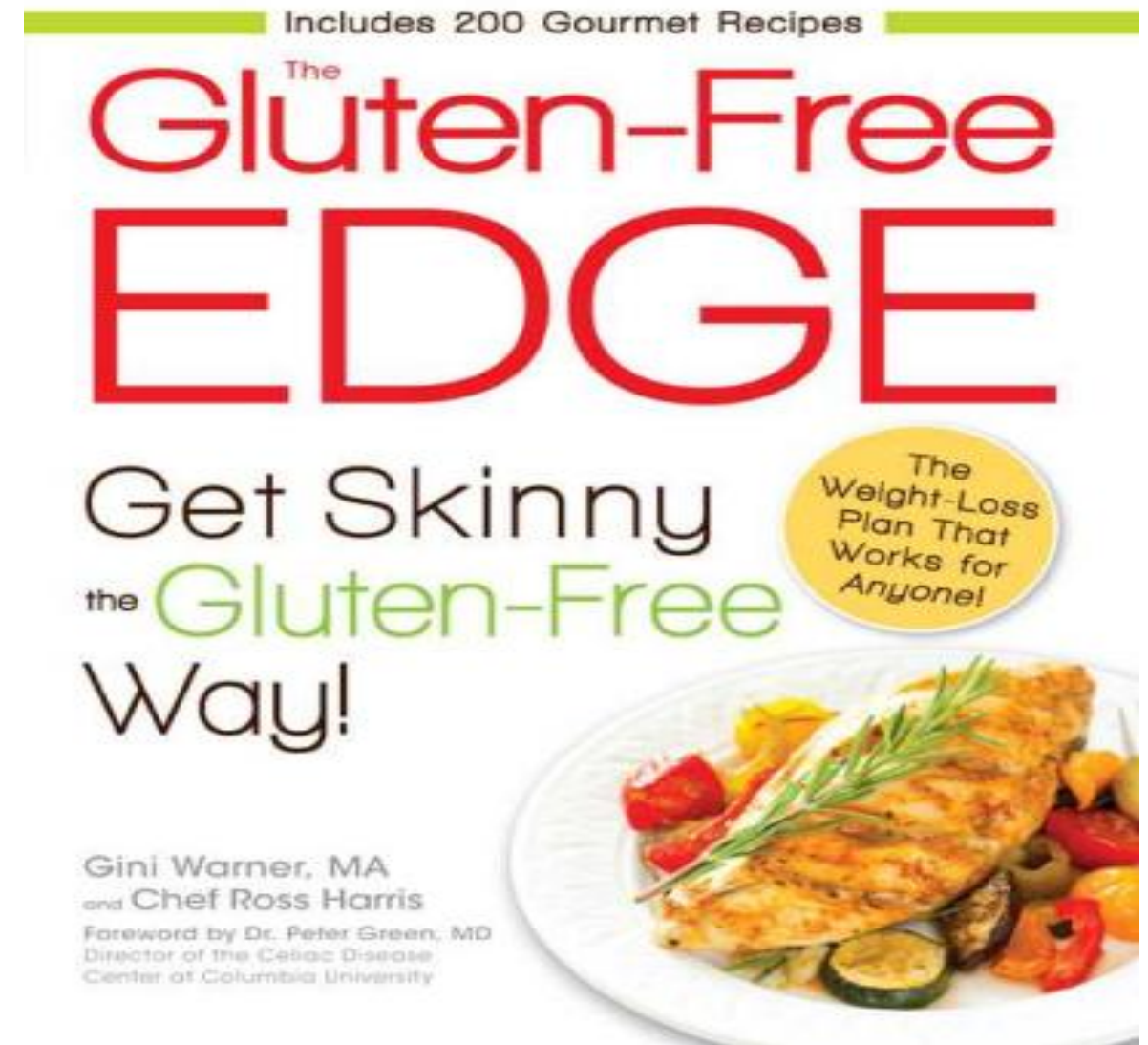
# Gluten-related Disorders

- Celiac Disease
- Wheat Allergy
- Gluten Sensitivity
  - Not diagnosed on allergic or autoimmune mechanisms
  - Controversial
  - Subject to risk of placebo effect



# Gluten-Free Diets

- Important for individuals with celiac disease
- Newest health fad
  - Claims of more energy, weight loss, etc
  - Very little research available to support or disprove claims





# “Have Your Gluten-Free Candy This Halloween and Eat It Too”



# Food and Nutrition Misinformation

- Consumers are increasingly taking charge of their self-care.
  - Positive in that sound nutrition can play an important part in one's life
  - Negative in that it makes people more vulnerable to food and nutrition misinformation that can impact their health and economic well-being
    - Nutrition misinformation can lead consumers to lose faith in traditional sources of nutrition information and pay less attention to results of new findings

# Accurate Food And Nutrition Information

- Is a result of significant scientific agreement from studies that have withstood peer review
- Is a result of studies that have been replicated

# Concluding Statements

***It is our responsibility as nutrition scientists and educators to act as credible sources of science-based nutrition recommendations.***

***We must work to prevent the attitude:***

***“Just eat whatever the heck you want. One day something’s bad for you, one day it’s good for you. Maybe I’ll get lucky and smoking will be good for me too.”***

# EVALUATING INFORMATION YOU FIND ONLINE

- Food and Nutrition Information Center
  - <http://fnic.nal.usda.gov>
    - Consumer corner
    - Eating for health
    - On-line health information
  - Evaluating Health Information on the Internet
  - Evaluating Internet Health Information: A Tutorial from the National Library of Medicine
  - Online Health Information: Should You Believe What you See?
  - Tips for Healthy Surfing Online
- Nutrition and Health Search Engines
  - Healthfinder.gov
  - MEDLINEplus Health Information
  - Health Information-National Institutes of Health

# Websites with Reliable Nutrition and Health Information

American Dietetic Association

<http://www.eatright.org>

National Institutes of Health <http://www.nih.gov>

Food and Drug Administration <http://www.fda.gov>

Centers for Disease Control and Prevention

<http://www.cdc.gov>



# More Websites with Reliable Nutrition and Health Information (continued)

American Council on Science and Health

<http://www.acsh.org>

Quackwatch

<http://www.quackwatch.org>

National Council Against Health Fraud

<http://www.ncahf.org>

# UC Davis

## Department of Nutrition

### Nutrition Information

- <http://nutrition.ucdavis.edu>
- <http://chnr.ucdavis.edu>