

Food, Nutrition and California Agriculture Opportunities and Risks

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Changing Expectations of a Healthy Diet

Prevention of primary nutritional deficiencies



Reductions 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”

Public's Hope for Diet

“Optimal” diets will maximize an individual’s potential for: A long, healthy and productive life

But, what is “long, healthy and productive”?

What are the real targets?

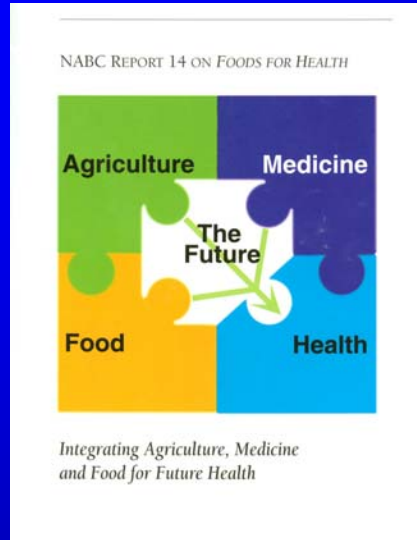
Public's Expectations of the Food Industry and the Scientific Community

The identification of “healthy” diets and foods

The definition of how they work

The production of improved healthy foods

The communication of dietary information for the “individual” as well as for the general public.



National Agricultural Biotechnology Council Report 2002

Examples where diet may modulate the development and progression of chronic diseases:

- **Age related vision loss**
- **Cancer**
- **Cardiovascular disease**
- **Diabetes**
- **Hypertension**
- **Obesity**
- **Osteoporosis**

Dietary Reference Intakes: Nutrition for Optimal Health

Traditional approach: minimal need plus a safety factor to prevent deficiency diseases

New approach: incorporation of concepts of disease prevention

Dietary Reference Intakes (DRIs)

Traditional approach: minimal need plus a safety factor to prevent deficiency diseases

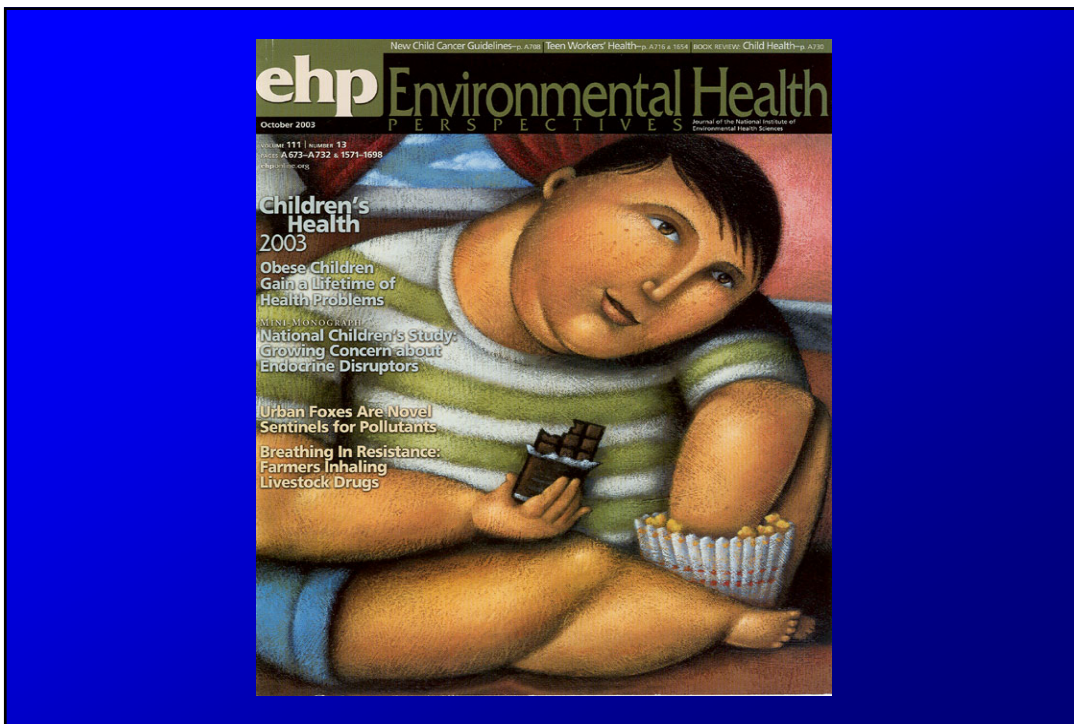
New approach: incorporation of concepts of disease prevention

- Estimated Average Requirement (EAR)
- Recommended Dietary Allowance (RDA)
- Adequate Intake (AI)
- Tolerable Upper Intake Level (UL)

Influences on Nutrient Needs

- **Age**
- **Gender**
- **Genetics**
- **Reproductive status**
- **Environment**
- **Lifestyle habits**
- **Presence of disease**

How healthy are we?



An estimated 17 million people (6.2 % the population) in the United States have diabetes mellitus.

By 2010, as many as 50 to 75 million Americans may exhibit the “metabolic syndrome” (aka Syndrome X)

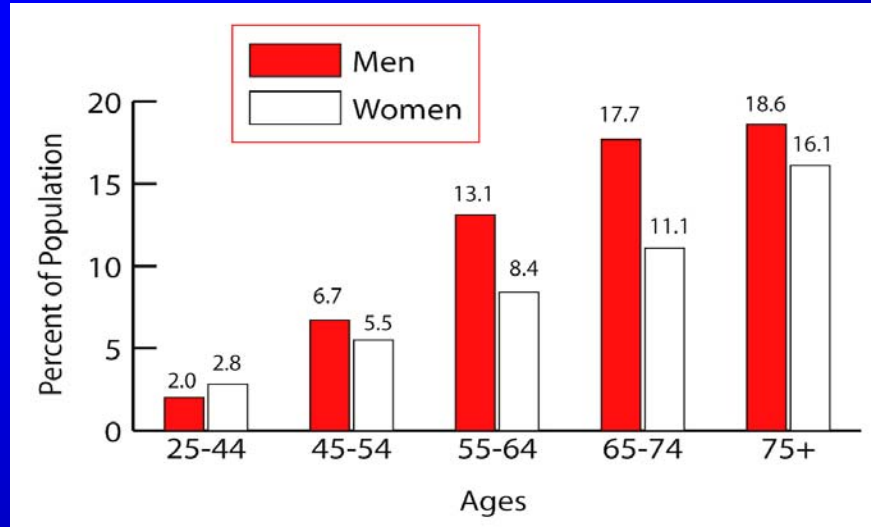
**Can we reduce the risk for diabetes through diet?
Can we reduce the pathologies associated with diabetes?**

Prevalence of Coronary Heart Disease by Age and Sex

III: 1988-94

NHANES

American Heart
Association
Learn and Live...



Source: CDC/NCHS.

Current evidence suggests that between 20 and 30 percent of cancers are due to poor food choices and physical inactivity. The role of nutrition and diet in cancer development is complex.

Key et al *Lancet* 2002; 360:861-868

Actual Causes of Death in the United States in 1990 and 2000

Actual Cause	No. (%) in 1990	No. (%) in 2000
Tobacco	400,000 (19)	435,000 (18.1)
Poor Diet and Physical Inactivity	300,000 (14)	400,000 (16.6)
Alcohol Consumption	100,000 (5)	85,000 (3.5)
Microbial Agents	90,000 (4)	75,000 (3.1)
Toxic Agents	60,000 (3)	55,000 (2.3)
Motor Vehicle	25,000 (1)	43,000 (1.8)
Firearms	35,000 (2)	29,000 (1.2)
Sexual Behavior	30,000 (1)	20,000 (0.8)
Illicit Drug Use	20,000 (<1)	17,000 (0.7)
Total	1,060,000 (50)	1,159,000 (48.2)

Mokdad et al., 2004; JAMA 291: 1238-44



Global Assessment of Organic Contaminants in Farmed Salmon

“Risk analysis indicates that consumption of farmed Atlantic salmon may pose health risks that detract from the beneficial effects of fish consumption.”

Hites et al., Science. 2004; 303: 226-9

Dietary Soy and Increased Risk of Bladder Cancer: A Prospective Cohort Study of Men in Shanghai, China

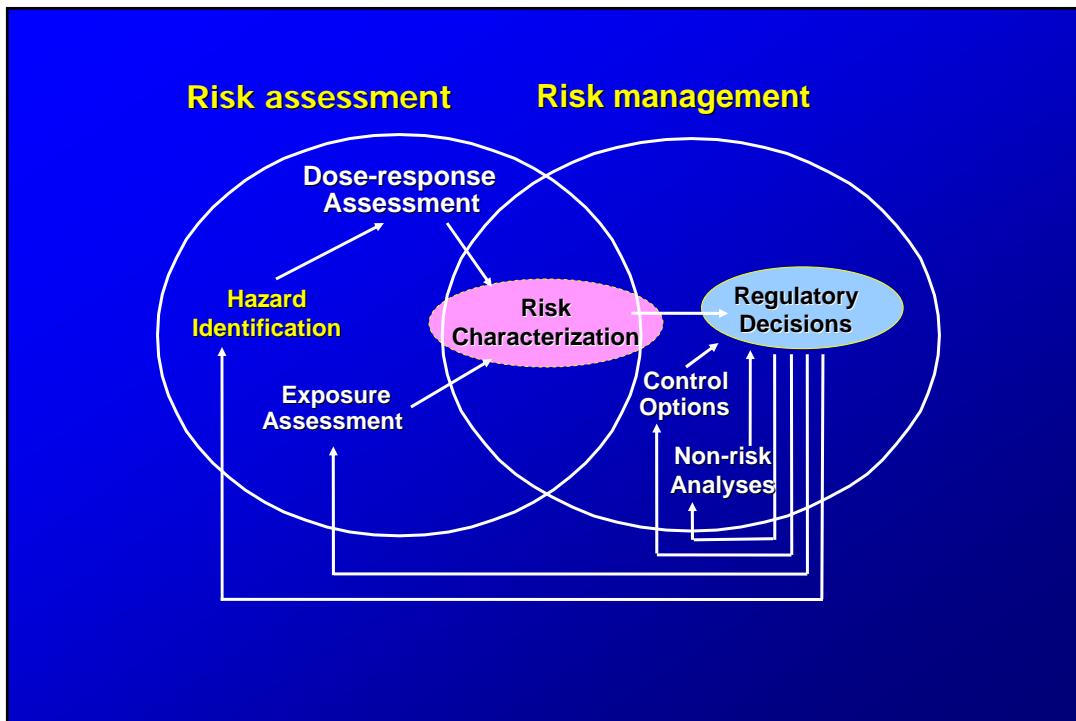
“Compared to men consuming soy less than once a week, the RR (95% CI) for those who consumed soy 1-<3 times per week, 3-<7 times a week and daily were 2.05 (0.80-5.29), 2.45 (0.89-6.76) and 4.61 (1.57-13.51), respectively (p for trend = 0.004), after adjustment for age, cigarette smoking and level of education. The soy-bladder cancer risk associations in smokers and non-smokers were comparable.”

Sun et al., Int J Cancer 112: 319-323, 2004

Common Issues: Disparate Approaches

- **How safe is safe?**
Statutory interpretations and constraints
- **What are the risks?**
Risk assessment procedures and risk management practices are consistent across regulations and agencies
- **How good is the quality control?**
Hazard Analysis Critical Control Points (HACCP)

USDA – FDA – CDC - EPA

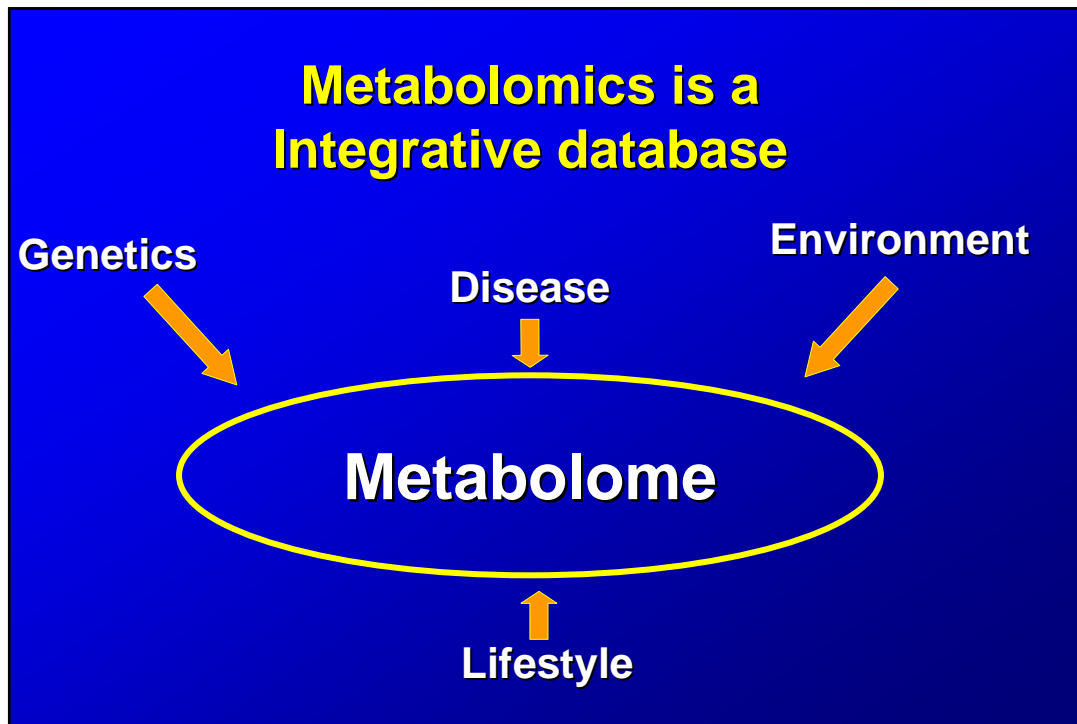


“In the long run, we expect that the use of “omics” technologies can be applied to a variety of bioassays, some *in vitro*, some *in vivo*, that will help us prioritize chemicals for testing in the more lengthy, expensive, and animal-intensive testing batteries, and perhaps even to guide selection of which tests should be done within those batteries.”

Robert Kavlock, EPA
Environmental Health Perspectives
112: A678-A685, 2004

“Some companies will not test a drug with a microarray experiment that has any chance of becoming part of a regulatory package. And then there are companies who view [submission of microarray data] as a positive, who say the FDA gets more information, we get more information, and we might find a positive aspect to our drug that we didn’t know about.”

Kurt Jarnagin, Iconix Pharmaceuticals
Environmental Health Perspectives
112: A678-A685, 2004



Tea

- **Does Tea Affect Cardiovascular Disease? A Meta-Analysis**
 - 10 cohort and 7 case-control studies
 - RR estimates for myocardial infarction relatively homogenous
 - MI incidence reduced by 11% with 3 cup per day increase in tea consumption
 - RR estimates for coronary heart disease and stroke were heterogeneous

Peters et al. *Am J Epidemiol* 2001; 154:495-503