

Grand V Challenge

We must improve human health, nutrition and wellness of the U.S. population



Current Health Challenges

- Large health care costs (estimates range from \$2.5 to \$3 trillion in 2008 and 2009) in the United States create a need for innovation in disease prevention, medicine and public health
- 68% of the U.S. population age 20 or older is either overweight or obese. Lack of physical activity in children and adults.
- Negative changes in the food, physical and social environment.
- The aging population is more prone to chronic diseases such as arthritis, diabetes and cancer
- As obesity and diet-related disease rates increase in the United States, public health is further threatened by food-related issues such as antibiotic resistance; food, air, soil, and water contamination; natural resource depletion; and climate change .
- A transdisciplinary approach, encompassing many disciplines, must be used to address food system research and policy issues.

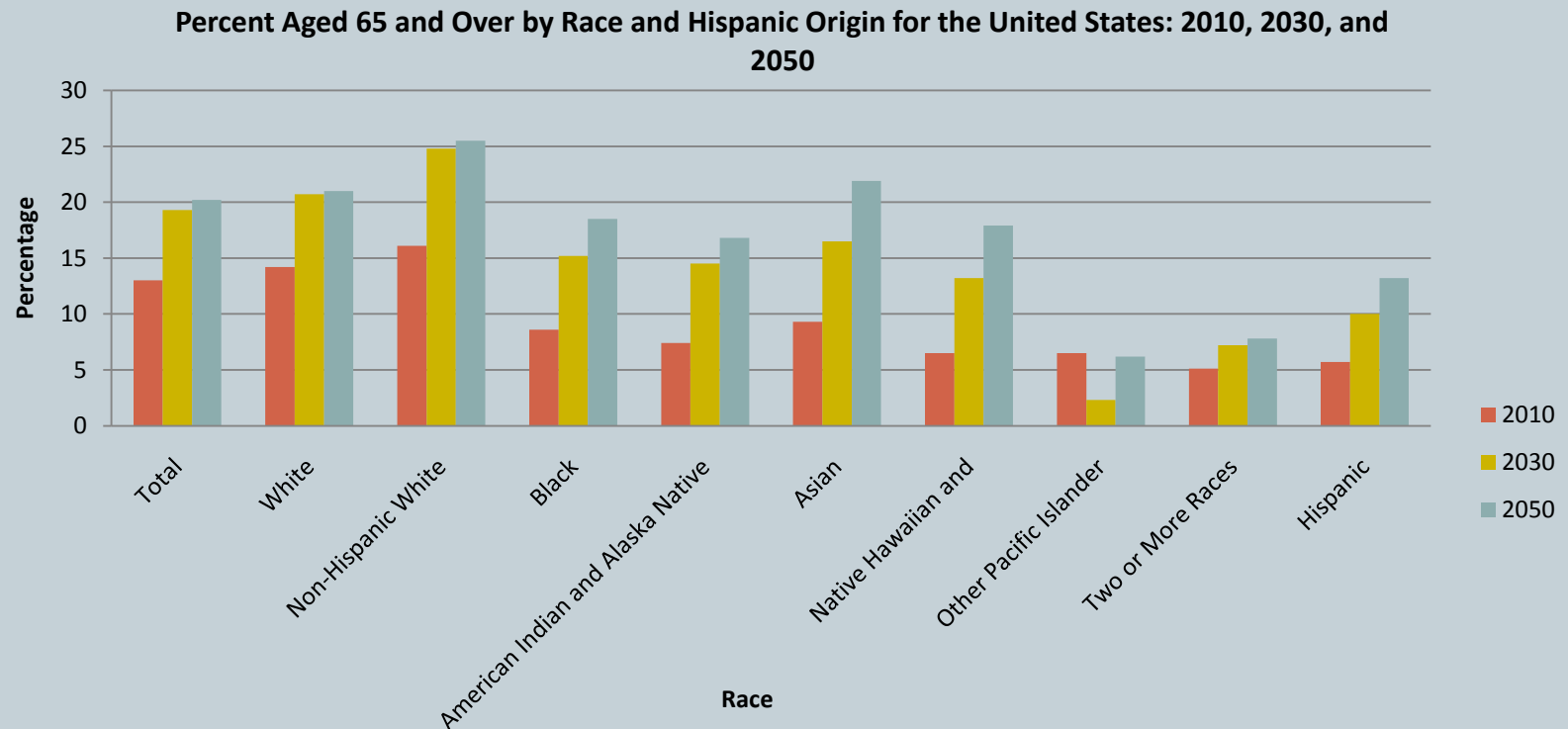
Negative Changes in the Food, Physical and Social Environment

- Low-cost food supply that is high in fat, sodium and added sugar.
- The availability of larger portion sizes consumed inside and outside of the home.
- Neighborhood designs leading to increased dependence on cars and less opportunities for physical activity.
- School policies that shorten lunch periods that allow the purchasing of sweetened beverages and snack foods.
- Decreased daily energy expenses and inactive lifestyles due to televisions, computers, etc.



✓ **These changes have been linked to the rise of obesity, as well as the subsequent increase in chronic disease.**

The Older Population in the United States: 2010, 2030 and 2050



According to a report by the U.S. Census Bureau, Between 2010 and 2050, the United States is projected to experience rapid growth in its older population. In 2050, the number of Americans aged 65 and older is projected to be 88.5 million, more than double its projected population of 40.2 million in 2010.

Age is Strongly Associated With Impairment in Activities in Daily Living

- 40% of Americans over age 65 exhibit one chronic disease, disability or other functional deficit.
- Our health care system is now shifting to accommodate an older population requiring complex (and expensive) care.
- 75% of all health care dollars are spent on older adults.



A System's Approach to Health and Nutrition

- Traditionally, single discipline approach.
- Consider the entire food system - production, harvesting, storing, transporting, processing distribution, consumption and disposal of food.
- A research approach that considers the entire food system and that connects agriculture with health and behavioral sciences through education and extension is required to truly understand the ways that the food system can improve human health



Disease Prevention and Optimal Health

- Disease prevention and optimal health are, to a large extent, due to behaviors in which individuals choose to engage (or not engage).
- It has been estimated that 50% of morbidity is due to behaviors that are under individuals' control, while the remaining portion is genetically predisposed.
- Aging processes encompass factors from the molecular level to the societal level and these factors affect not only the rate of functional decline but also the means to promote health and maintain quality of life.
- An understanding of the interactive effects on aging of nutrition, exercise, psychosocial factors, assistive technology and the built environment has the potential to mitigate declines that are associated with aging.
- Additionally there is a great need for researchers with the interdisciplinary background required to envision, study and understand these interactions and for professionals to meet the growing need of older Americans.



Technologies to Improve Health

- New science and technologies need to be advanced
 - ✓ Nutritional genomics or nutrigenomics, - how whole foods or food components affect the regulation of our genes and how individual genetic differences can affect the way we respond to nutrients (and other naturally occurring compounds) in foods we eat.
 - ✓ Exercise plays an important role in prevention or delay of chronic disease. It is clearly beneficial to heart and blood vessel health via novel mechanisms.
 - ✓ Nano-encapsulation can enhance health benefits of processed foods by providing protective barriers, flavor and taste making, controlled release and better dispersibility for water insoluble food ingredients and additives.
 - ✓ The microbial flora in the human gut is another important factor in human nutrition.
- Understanding that our increasing lifespan must be coupled with an increasing health span to improve human health and wellness.

Developing the Science to couple Diet and/or Physical Activity

- Inadequate diet and/or physical activity can be serious risk factors for chronic diseases.
- The degree to which diet or exercise influences the balance between healthy and diseased states may depend on an individual's genetic makeup.
- Diet and exercise regulated genes are likely to play roles in the onset, incidence, progression and/or severity of chronic diseases.
- Dietary intervention based on knowledge of nutritional requirements, nutritional status and epigenetics (i.e. "personalized nutrition") can be used to prevent, mitigate or cure chronic disease.
- The role of exercise in a healthy lifestyle .



Identifying Priority Areas Within Communities That Can Best Prevent Obesity in Children and Weight Gain in Adults

- Develop community-based participatory methods that identify priority areas within communities that can best prevent obesity in children and weight gain in adults.
- Develop cost-effective ways of providing healthy foods and adequate physical activity to children in child-care centers and schools.
- Determine what type of knowledge and skills, environment and support systems help children and adults make healthy lifestyle decisions related to food and physical activity and assess their impact.
- Carefully define the importance of exercise can provide motivation for developing practices that yield significant health benefits.



Policy Developments that Improve the Food, Physical and Social Environments



- At the community level, policies can improve neighborhood design with the potential to increase physical activity choices and improve accessibility to healthy foods.
- At the state level, policies that aim to improve the school environment could alter the availability of vending foods and increase the amount of physical activity available to their students.
- Nationally, policies that address advertising and marketing practices.

Summary of Research Needs and Priorities

- Asses whether organic and other sustainable production systems produce more nutritious or healthier foods.
- Comparisons of the Healthfulness of Food Products.
- Identifying Priority Areas Within Communities That Can Best Prevent Obesity in Children and Weight Gain in Adults.
- Using Environmental Scans.
- Understand healthy aging via a lifespan perspective.
- Understand factors that contribute to Chronic diseases and aging processes.
- Asses how cumulative biological and psychological stresses can create the “wear and tear” on the body.
- Investigate the potential of nutritional genomics.
- Asses nanocochleate-based nutrient delivery for micronutrients and antioxidants.
- Investigating the metabolic potential of gut microbes, after obtaining the bulk DNA.
- Expanding research on selection and breeding.

Thank you