

# An Economic Perspective on Nutrition and Food Safety Interventions

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# Overview

- Why economics?
- Balancing costs and benefits
- Comparing alternatives
- Understanding individual and system-wide behavior
- Lessons



# Why Economics?

- Market Failures in Nutrition and Food Safety
  - Consumers can't perceive many safety or nutritional characteristics
  - Neither producers nor consumers bear the full costs of poor safety or nutrition
  - Market can't find the match between willingness to pay and the costs of production
  - But better information has reduced market failures in recent years



# Why Economics?

- Can we put a value on good health? On safe or healthy food? On better health today vs better health tomorrow?
- We do this implicitly every day through choices we make.
- Valuation allows us to consider trade-off's in a clear and explicit way.
- Provides a decision framework for comparing alternatives.



# Why Economics?

- Can we predict how people or firms will respond to an intervention?
- Predicting behavior that will result from an intervention
  - Prices or income shape choices
  - Information may motivate choice
- Choices add up and shape outcomes for everyone— system-wide effects



# Economic Applications

- Benefit/ cost analysis for specific regulations
- Cost-effectiveness analysis for specific interventions
- Broader analysis of potential impact of changes in the food system
  - Changes in demand and supply with new technologies, bans, taxes, etc.
  - Examine net welfare gain– do improvements for some outweigh costs for others?



# Benefit-Cost Analysis

- Required for any major regulation
  - Must consider the marginal impact of the regulation
  - Must consider alternatives and demonstrate why one was chosen
  - Must consider both economic benefits and health outcomes
  - Must consider sensitivity to alternative assumptions



# Measuring Health Outcomes

- QALY or DALY
  - Disability or Quality Adjusted Life Years
  - Premature death due to illness
  - Disability or reduced quality of life makes each remaining year  $< 1.0$
  - Add up over population
- Monetized QALY
  - Put dollar value on lost years or reduced quality of life



# Valuing Health Outcomes

- Cost of illness
  - Direct medical costs of illness
  - Lost productivity due to missed work, loss of life
  - Obesity example from CDC: \$9.1B
- Willingness to pay
  - What would you pay to reduce risk of illness or death?  
Or what would you accept for increased risk?
  - Wages in risky occupations are one measure
  - VSL example: \$7 to \$10 million

For more information: Kuchler and Golan, 1999, Assigning Values to Life: Comparing Methods for Valuing Health Risks, USDA/ERS AER 784



# Measuring Costs

- Direct accounting of industry costs
  - Capital equipment, training
  - Research investments
  - Recurring costs (eg., testing, ingredients)
- Market adjustments influence:
  - Who pays the costs
  - How much adaptation reduces costs
- Time frame influences comparisons

For more information: Unnevehr and Jensen, 2005, Industry Costs to Make Food Safe, in Hoffman and Taylor, RFF.



# Example: Trans fat Labeling

- Requires food products to disclose trans fat content on nutrition label (Jan 1, 2006)
- Reducing trans fat intake by 0.04% of calories prevents 600 heart attacks and 200 deaths
- Benefits of \$2 to \$6 Billion per year
- One time industry costs for testing, re-labeling, reformulation of \$139 to \$275 million
- Alternatives: saturated fat? ban?

Source: USHHS, Federal Register, July 11, 2003.



# CBA Example: *Salmonella enteritidis* in Shell Egg Rule

- Rule requires shell egg producers to implement measures to prevent SE
- 68,790 illnesses averted
- Costs \$83 million (or \$1,200 per illness)
- Benefits \$1,231 million
  - Assumes VSL of \$5 million
  - Avg loss per case \$17,900, but much of that due to small number of reactive arthritis cases
- Alternatives consider different points of intervention in supply chain



# Cost-effectiveness

- Compare how many saved under different cost scenarios
- Identify lowest cost way to improve health or to achieve a specific health goal



# Example: Biofortification

- Altering nutrients in food crops
  - Examples include Vit A in rice, folate in wheat
- Improving crop nutrient content is more cost-effective than traditional interventions
- Cost of Saving One DALY through VA in India
  - Supplements \$134-600
  - Fortification \$84-98
  - Golden rice \$3.4-35



# System-Wide Impacts

- Predicting behavior
- Identifying where impacts greatest or where assumptions matter
- Adding up changes and their interactions



# Example: Food Prices and Diabetes

- Higher prices of low carbohydrate foods associated with increased probability of diabetes diagnosis and higher medical costs
- Subsidy for low carbohydrate foods could reduce medical costs
  - Net savings of \$17B annually for a 30% subsidy
  - Results depend on price sensitivity
  - Targeted vs untargeted subsidy



# Example: Danish Ban on Antibiotics as Growth Promotants in Pork Production

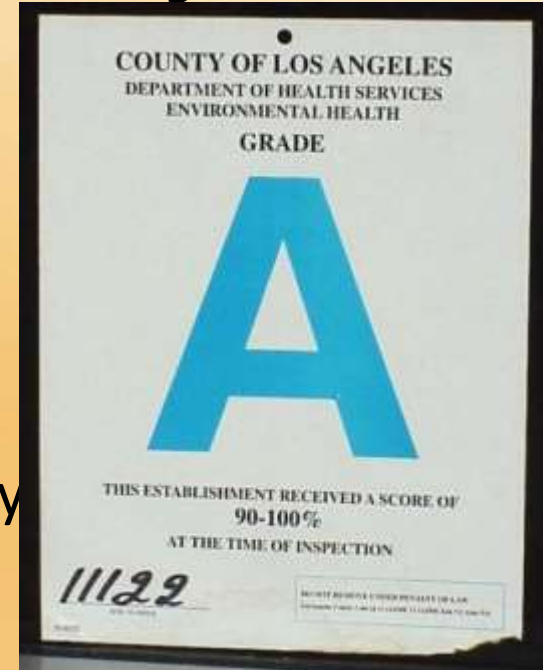
- Ban at finishing stage did not increase costs much
- Ban at weaning stage incurred large costs
  - Increased therapeutic use and total use
- 80% of total benefits for 20% of total costs at finishing stage; with large additional costs and modest benefits for adding weaning stage

Source: Hayes and Jensen, 2003, Lessons From the Danish Ban on Feed-Grade Antibiotics, CARD, Iowa State University



# Example: Report Cards for Los Angeles Restaurants

- January 16, 1998, LA county inspectors start issuing hygiene grade cards
- Grade cards are prominently displayed in restaurant windows
- Major impacts after grade cards
  - dramatic increase in hygiene quality
  - decrease in the dispersion of hygiene quality
  - Revenue responsive to hygiene grade
  - foodborne illnesses drop 20%



Source: Jin and Leslie, 2003, Effect of Information on Product Quality, *Quarterly Journal of Economics*



# Lessons

- Market failures mean that there are often net benefits to interventions
- Information is key to nutrition and food safety issues
- Comparison among alternatives is more useful than simple analysis of one intervention
- Economists need to work with scientists to understand risks, outcomes



# For More Information

<http://www.ers.usda.gov/Briefing/DietQuality/>

<http://www.ers.usda.gov/Briefing/FoodSafety/>

