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United States Department of Agriculture
Food Safety and Inspection Service



Role of Economics in Pathogen Control Regulations

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**Office of Policy, Program, and Employee Development
Food Safety and Inspection Service, USDA**

**ERS Conference – November 16, 2007
Washington, DC**



FSIS Activity

In FY06

- ~ 7,600 full-time inspectors
- ~ 5,921 processing establishments inspected daily
- ~ 1,100 slaughter establishments in which every animal inspected
- ~ 140 million head of livestock; 9.3 billion poultry carcasses; 4.4 billion pounds of liquid egg product
- ~ 8 million inspection procedures annually
- ~ 3.9 billion pounds of meat and poultry and ~ 5.9 million pounds of liquid egg products presented for import inspection



FSIS Inspection Systems

Traditional system (beginning - 1906)

- Regulatory enforcement
 - Animal disease
 - In-plant focus of sanitary operations

HACCP system (beginning - 1996)

- Food safety hazard control
 - Prevent, eliminate, reduce biological, chemical, and physical hazards reasonably likely to occur

Risk-based system (evolving beyond HACCP - 2006)

- Focus on risk of product and the degree of control of risk
- Conducting inspection in a manner designed to measurably impact public health and effectively use inspection resources



Inspection System Design

- Microbiological data, in the form of verification testing results for each establishment, supplement on-site observations and give a perspective on compliance with regulatory requirements over time
- Changes in the % positive rate serve as an early warning of systemic problems arising, tracked quarterly and annually
- Public health assumption is that a reduction in the % positive rate of product containing pathogens of public health concern should result in a reduction on disease incidence in humans



Healthy People 2010 Objectives

Campylobacter infections*:

<u>1997 Baseline</u>	<u>2010 Target</u>
24.6	12.3

Escherichia coli O157:H7 infections*:

<u>1997 Baseline</u>	<u>2010 Target</u>
2.1	1.0

Listeria monocytogenes infections*:

<u>1997 Baseline</u>	<u>2010 Target**</u>
0.5	0.25

Salmonella infections*:

<u>1997 Baseline</u>	<u>2010 Target</u>
13.7	6.8

*Laboratory confirmed cases/100,000 humans (FoodNet)

** Changed to year 2005 by E.O. (President Clinton)



Food Safety concerns – *Salmonella*

- CDC estimates **1.4 million** cases of foodborne illness annually
- For 2006, CDC estimated the *Salmonella* incidence at 14.81 cases per 100,000 population (2010 goal of 6.8 cases per 100,000)
 - *S. Typhimurium* decreased significantly from baseline (MMWR 56(14): 337)



FSIS Public Health Driven Program

- *Salmonella* verification sampling program for raw product ($\geq 90\%$ Category 1 target by 2010 – i.e., at half the current standard)

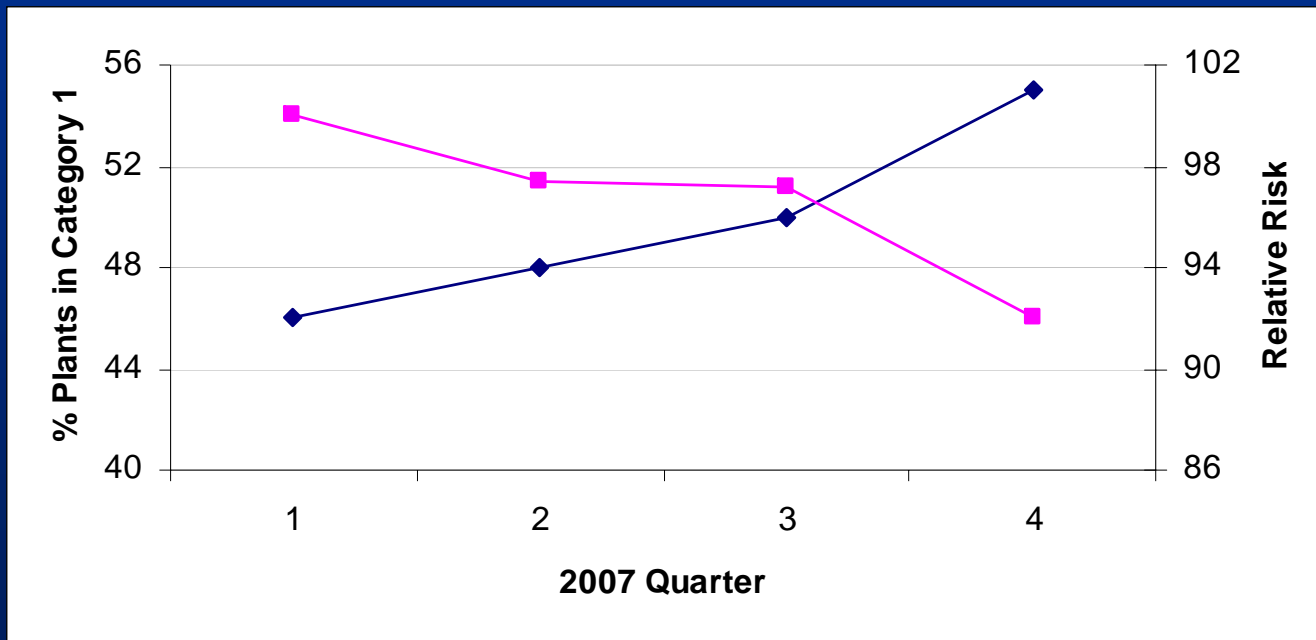


Salmonella Categories

Set History

<u>Previous</u>	<u>Current</u>	<u>Category</u>
≤ 50% of standard	≤ 50% of standard	1
<ul style="list-style-type: none"> • No prior set • >50% • Above standard 	≤ 50% of standard	2
Any result	> 50% of standard without failing	
Any result	Exceeded standard	3

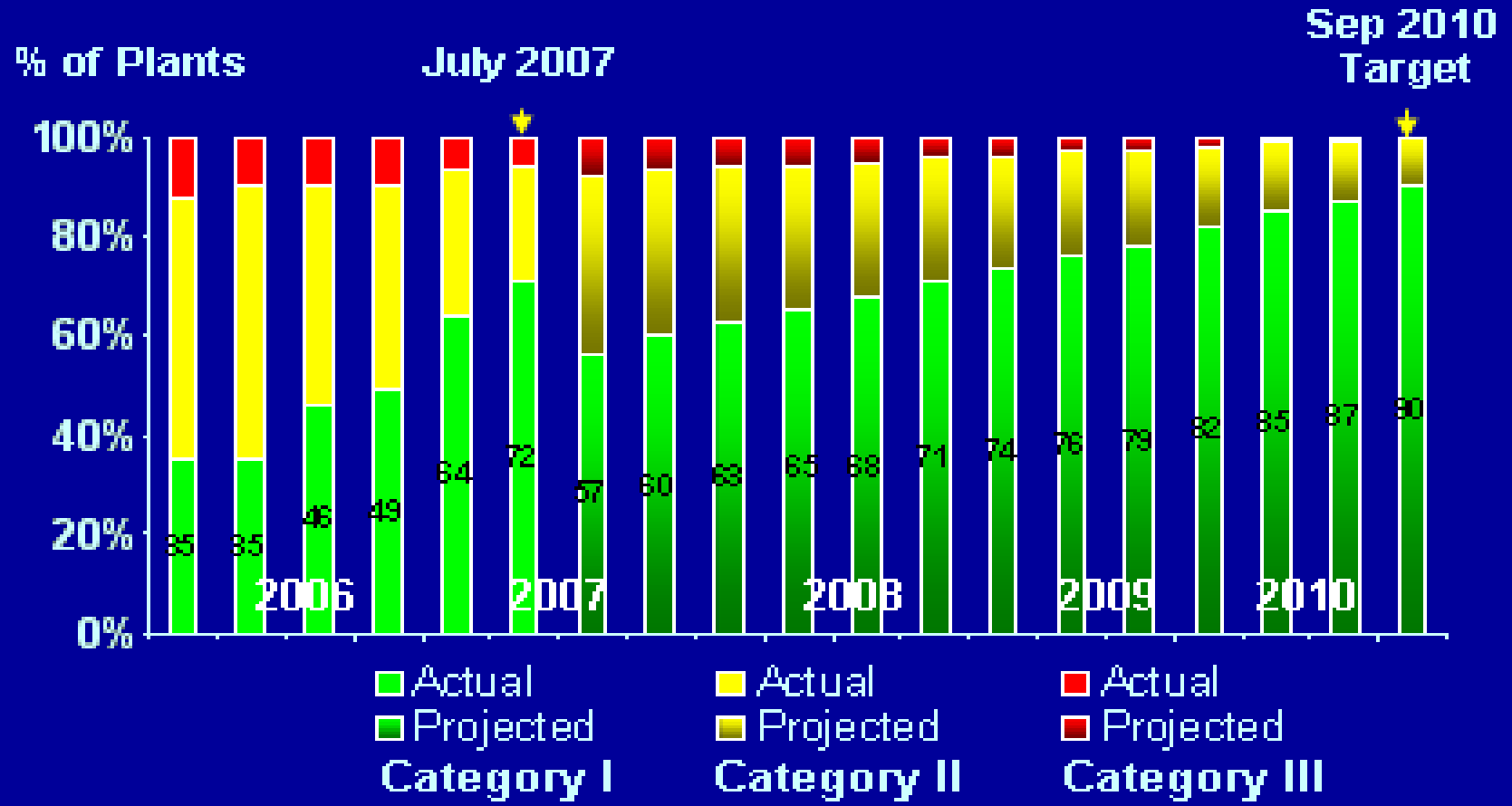
Predicted Public Health Benefits – *Salmonella* on Broiler Carcasses



As the proportion of establishments in Category 1 increases (blue line), the relative risk of illness from *Salmonella* on broiler carcasses decreases (pink line)



Program effectiveness: Categorization of broiler establishments





Category 1 Update – November 2007

- Broilers

- 73.5% (up from ~35% in 1st Qtr CY2006 when first tracked)



FSIS % Positive Rate

Source	Raw Product <i>Salmonella</i>	Raw Product <i>Salmonella</i>
	Baseline	3rd Quarter CY2007
Broilers	20.0%	10.6%
Cow/Bulls	2.7%	1.3%
Ground Beef	7.5%	4.1%
Ground Chicken	44.6%	28.3%
Ground Turkey	49.9%	16.3%
Market Hogs	8.7%	3.0%
Steers/Heifers	1.0%	0.2%
Turkeys	19.6%	9.4%



Long Term Focus on *Salmonella* and *Campylobacter*

1. Looking at primal/sub-primal and other parts of raw products in Federal establishments regarding new performance standards based on current baseline studies
2. Looking at carcasses and parts at retail, particularly poultry, and association between the type and enumerative level of these pathogens at slaughter, further processing, and retail



How Economics Impact Risk Management

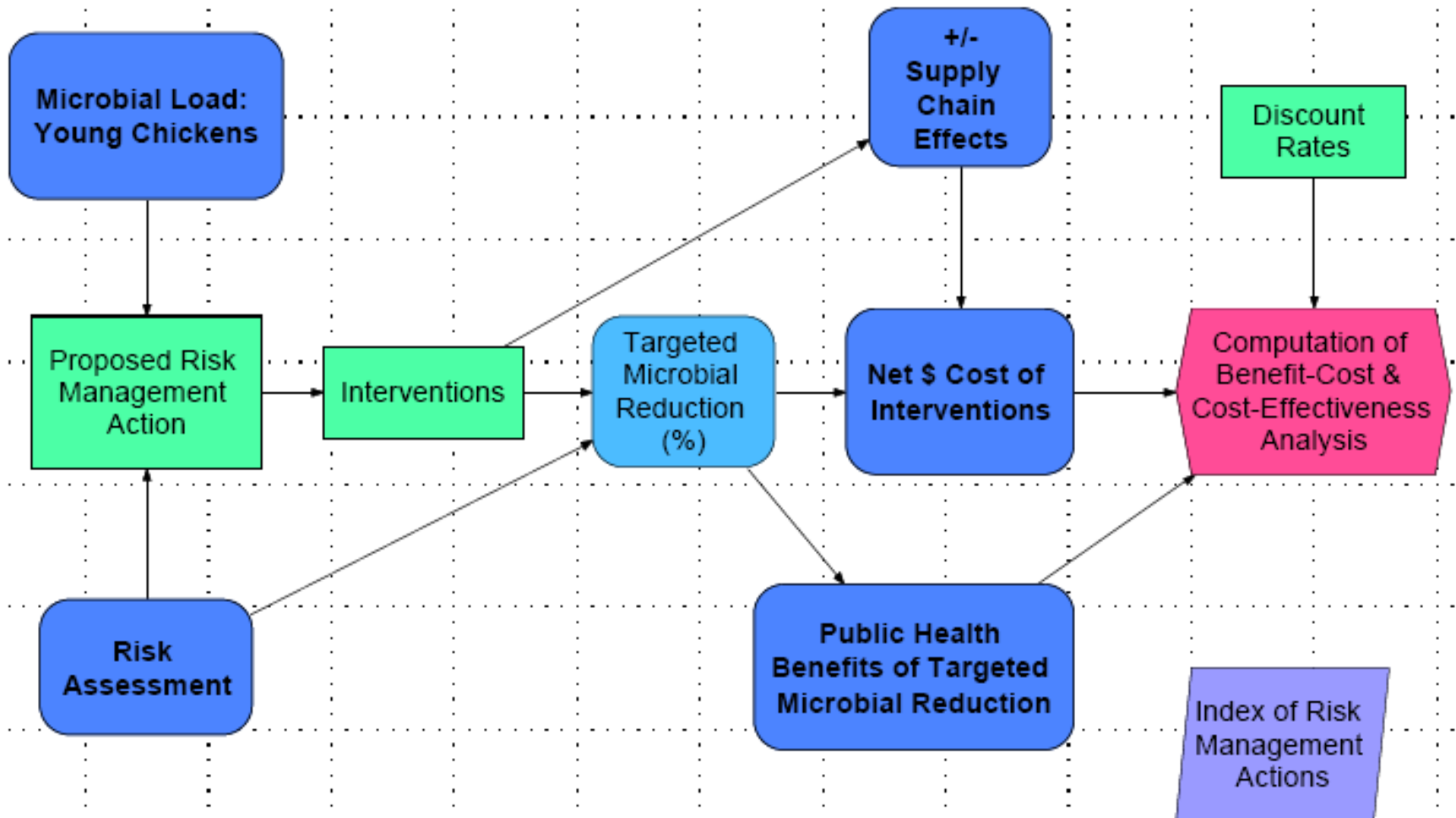
- Risk assessment for *Salmonella* and *Campylobacter* bacteria
 - Prevalence and serotype informs FSIS' selection of alternative risk management actions listed in an index for successive analysis of each alternative action
 - Establishments select interventions, based on a risk assessment
 - Interventions would effect supply chain; shift the supply curves of affected establishments because of net changes in costs and quantities of young chickens produced
 - Public health benefits of the reduction of the targeted microbes and the net dollar cost of the interventions for the targeted reduction of bacteria would be used for the computation of the benefit-cost and cost effectiveness analysis of each of the proposed risk management actions
 - The results would be a ranking of the cost-effectiveness ratios and the benefit-cost ratios of the risk management actions



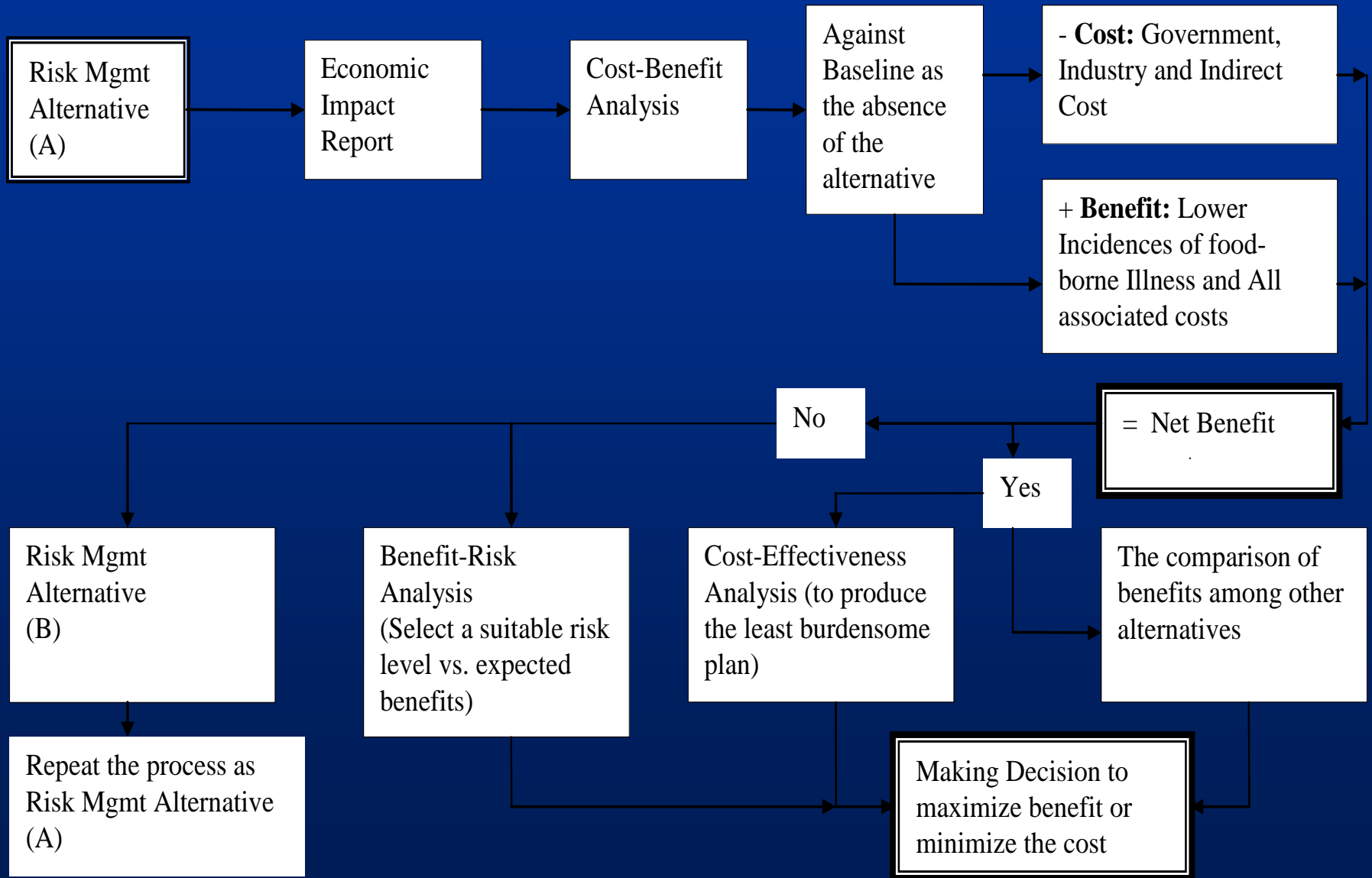
Impact Considerations

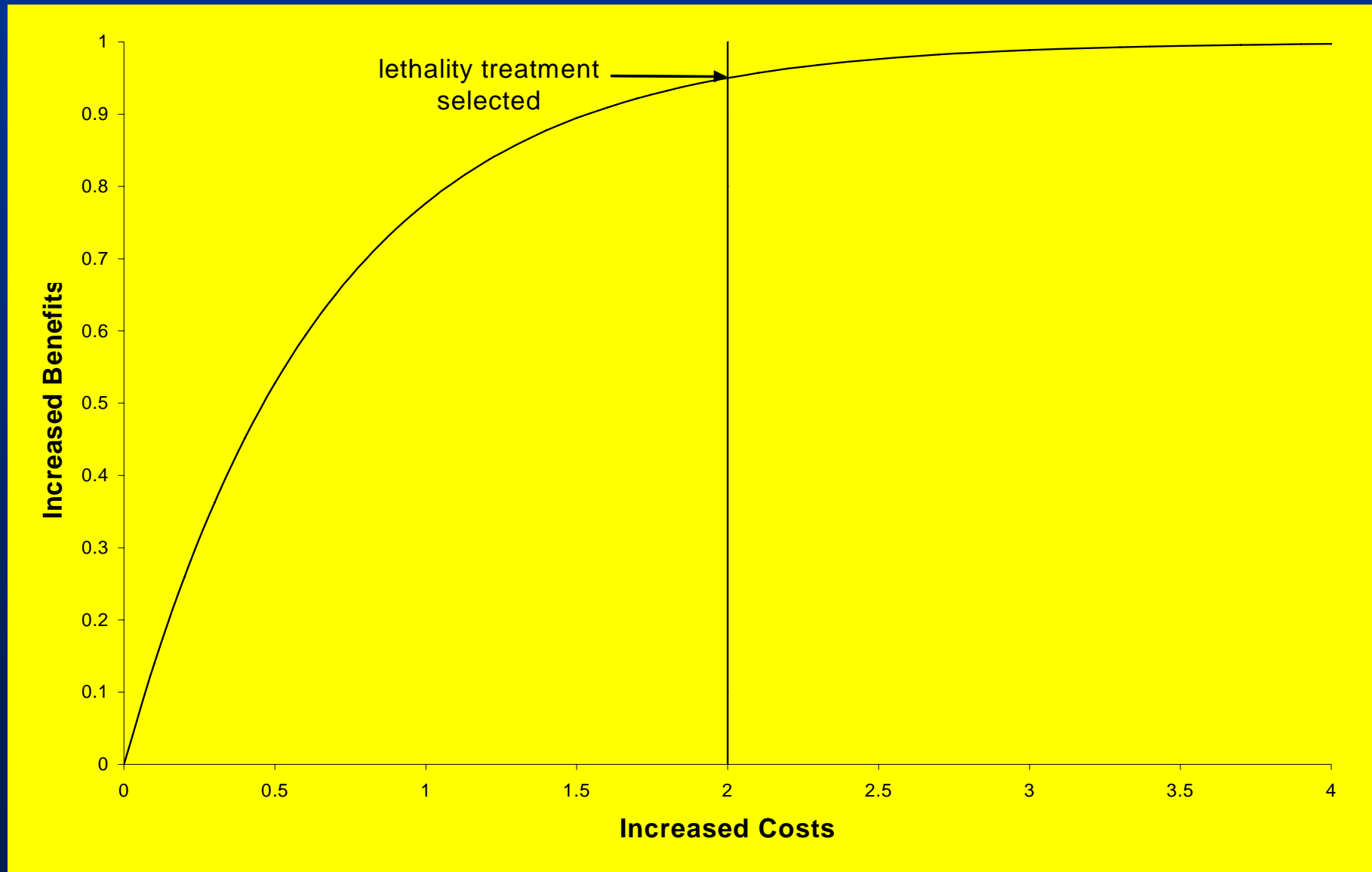
- **Producer**
 - Large, small, very small establishments
 - Establishments that also slaughter other poultry
 - Effect on new hires and training
 - Facility and equipment modifications/purchase
 - Adding inspection stations
 - Evisceration linespeed
 - Dressing performance standards
 - HACCP plan/Sanitation SOP modifications
- **Consumer – food safety vs other (e.g.,bruises)**
- **FSIS inspection – training**

How Economics Informs the Assessment of Risk Management Actions



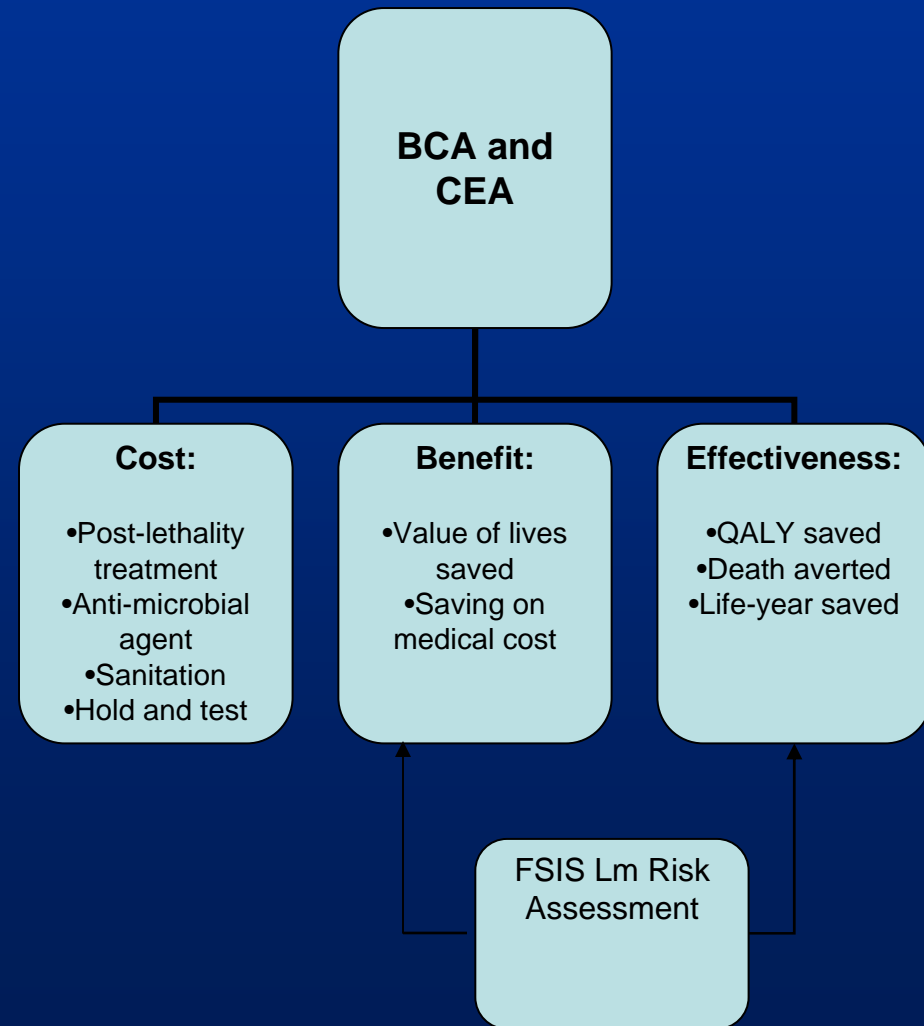
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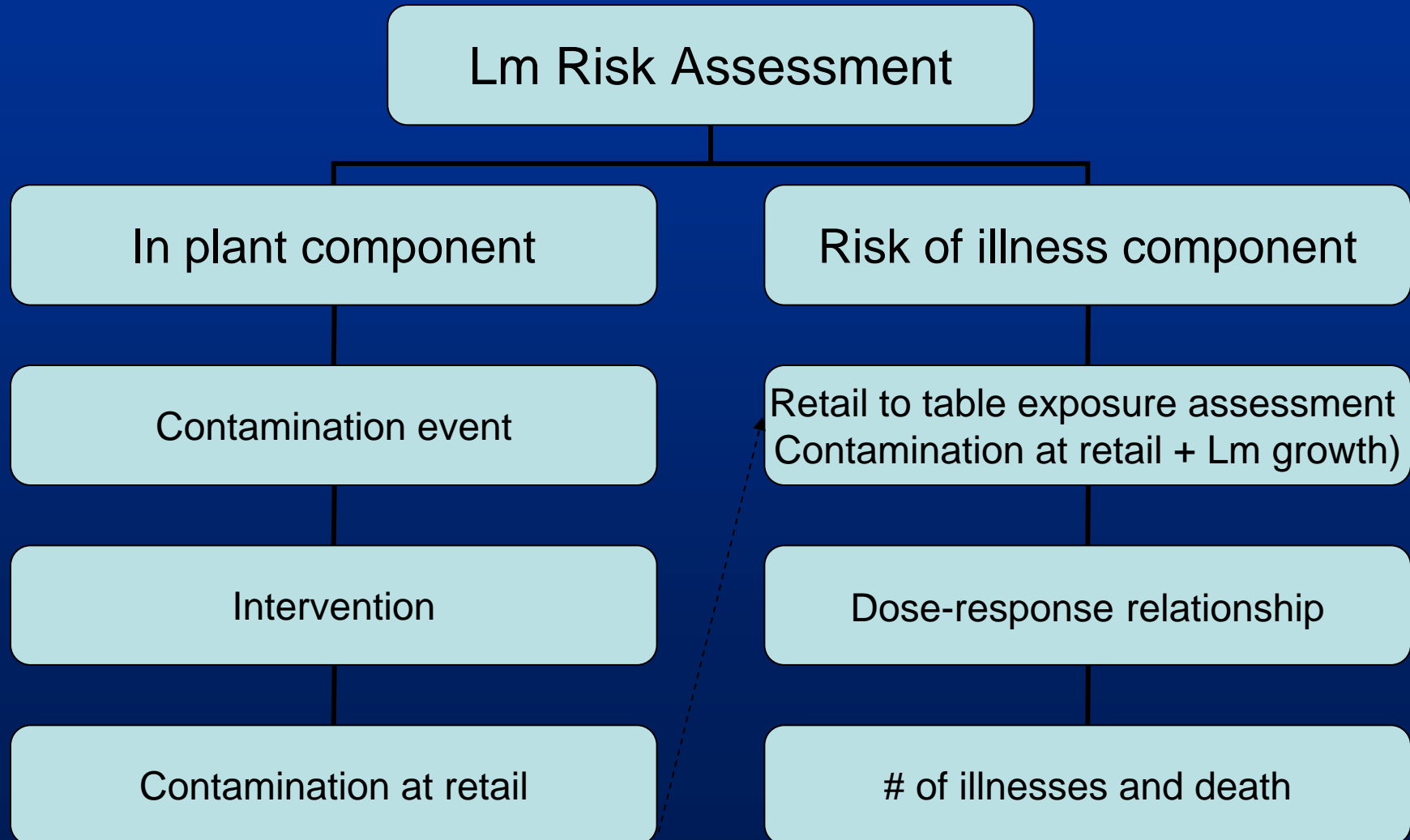


Economic Analysis for RTE *Listeria monocytogenes*

- **Benefit-cost Analysis** compares:
 - cost of the rule to industry, and
 - Monetized health benefit
- **Cost-effectiveness estimates:**
 - Cost per QALY saved
 - Cost per death averted
 - Cost per life-year saved
 - Net cost per QALY
- **Risk assessment model** estimates averted death and illnesses
- **FSIS** analyses policy alternatives by changing parameters in risk assessment model and the cost items



Dynamic Simulation Model



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Thank you