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ECONOMICS OF FOOD SAFETY

ORGANIZER T. ROBERTS (USA)**RAPPORTEUR C. NARROD (USA)**

This mini-symposium addressed the economics of human health risks associated with pathogens in the world's food supply: parasites and bacteria in meat, fungi producing mycotoxins in corn, and antibiotic use in animal feeds contributing to drug-resistance of bacteria causing human illness.

Public and private economic incentives for food safety

J. Hobbs (Canada), A. Fearné (UK) and J. Spriggs (Australia) began by looking at incentive structures for food safety and quality assurance. The forces escalating food safety actions in the United Kingdom have been better crisis management and restoration of consumer confidence, whereas in Canada and Australia risk management and prevention of trade-threatening food safety issues are more central. In Britain and Australia, food companies are increasing vertical alliances, partly in response to the UK 1990 Food Safety Act that requires 'due diligence' and increases legal liability for contaminated incoming products.

J. Skees, A. Botts and K. Zeuli (USA) dealt with recall insurance to improve food safety. It is possible to obtain insurance to protect businesses against losses due to food-borne pathogens from product recalls, disease outbreaks, sales losses or other business disruptions. To receive low insurance premiums, firms have an incentive to disclose their *maximum* food safety efforts. In contrast, under official regulations, firms have an incentive to identify the *minimum* number of critical control points for monitoring by regulators. There appears to be a case for institutional change.

T. Riggs, E. Elbasha and M. Messonnier (USA), looking at the effects of information on producer and consumer incentives to undertake food safety efforts, drew attention to a double moral hazard problem. It arises since neither consumers nor producers can accurately detect the other's efforts and both share the losses if illness occurs. Given this suboptimal outcome, government regulation could increase social welfare, especially if it increases information and causes changes in behaviour.

Private sector food safety incentives

E. Salay and A. Mercadante (Brazil) described how Brazilian feed companies attempt to control mycotoxins in corn, especially aflatoxin. Eighty per cent of

Brazilian corn goes into animal feed and mycotoxins can affect both animal and human health. The incentives for such private sector control come from client demands and competition with other companies, as well as a desire to improve process control and product quality.

R. Laxminarayan (USA) dealt with the complex economics of bacterial resistance in looking at optimal patent breadth for antibiotics used in animal feed and in human treatment. The incentives in the US patent system are designed to induce innovation and do not address the role of patents in protecting open-access resources like antibiotic effectiveness. When development of resistance occurs from antibiotic use it may be suboptimal, from society's perspective, to permit sales in two markets with different demand elasticities.

M. Gómez (USA) and J. Torres (Colombia), in looking at the Colombian poultry industry, suggested that the primary incentive for producers to become more efficient and to be able to ensure meat product safety is international competition. The WTO is causing traditional trade barriers to fall and Colombia is implementing new food safety regulations. The private sector is responding with its own food safety initiatives.

Food safety risk and its effect on technology choices

T. Roberts, C. Narrod and S. Malcolm (USA) began the third session by considering the control of *E. coli*. Many scientists investigating new control procedures for pathogens only report mean risk reductions. However, pathogen effects do not have a normal distribution and mean results can be misleading. Using control procedures in the beef slaughterhouse, examples are given of estimated generic *E. coli* risks in the mean model versus a probabilistic risk assessment model using the distribution of generic *E. coli*. Implications for policy making were discussed.

H. Jensen, D. Hayes, L. Backstrom and I. Fabiosa (USA) examined the economic effects of a ban on the use of over-the-counter antibiotics in pig rations. Swedish producer responses to changes caused by the ban on antibiotics in pig feeds were analysed. If a similar ban were imposed in the USA, pork prices were estimated to increase by 5 cents per pound at the retail level. However, America may ban fewer antibiotics, while use of other substitutes in production may reduce the economic impact and lower the estimated increase in pork prices.

T. Wang, V. Diderrick, J. Kliebenstein, S. Patton, J. Zimmerman, A. Hallam, C. Faulkner and R. McCord (USA) dealt with *Toxoplasma gondii* levels in pig production. Ingestion of *Toxoplasma gondii* by pregnant women can cause abortions or mental retardation in foetuses. Producers can control *Toxoplasma gondii* levels in market hogs by using bait and/or traps for rodents and total confinement facilities. Producer costs for control of the parasite are minimal, notably because there are significant economies of scale associated with swine confinement operations which most US producers have.

Discussant Richard Williams (USA) pointed out that there does not seem to be a general theory relating to the minimum requirements necessary to make

effective market changes. To spark debate, he presented four minimum conditions: some sort of desire for change, means to monitor change, financial ability to make change, and technical ability to make changes.