

costs and lower market supplies would be expected to raise consumer prices to some extent. From the information provided in this analysis (the expected small cost impacts relative to total value of production and the likely small quantity cut-backs), it is expected that these impacts would be minimal.

A related issue is the possible impact on other sectors of the economy. Census data show that swine, beef, dairy, and poultry industries supply significant amounts of raw product to the RTE MPP industry. Because, however, the quantity effect is expected to be minimal, these upstream suppliers of raw material are not expected to be significantly affected by the final rule.

Analysis of Benefits

The analysis of benefits resulting from the final rule examines the reduction in human health risk (deaths and illnesses caused by listeriosis) from actions taken as a result of this final rule by RTE MPP establishments in only one product group: deli meats (primarily sliced luncheon meats). This analysis of benefits thus differs from that in the PRIA which examined the reduction in human health risk from all RTE MPPs.

FSIS is focusing on deli products for several reasons. First, the FDA-FSIS risk assessment identified this product group as having the highest risk of all food classes and the cause of a large share of listeriosis deaths and illnesses. Second, the FSIS *Lm* Risk Assessment, when calibrated to a revised version of FDA-FSIS risk assessment, tied risk mitigation actions at deli-meat producing establishments to potentially lower rates of listeriosis death and illnesses. FSIS plans to modify the model to capture the dynamics of *Lm* contamination and containment in other RTE MPP products, such as hotdogs, along with the impact of production volume. Third, the FSIS *Lm* Risk Assessment, having been presented to the public for comment, has been revised to the extent possible at this time.

The analysis of benefits uses the FSIS *Lm* Risk Assessment to evaluate the human health risk reduction effects of sanitation coupled with FCS verification testing, the use of growth inhibiting packaging (GIP); and the use of PL treatments. The likely reduction in listeriosis deaths from a 100-percent adoption of these practices and treatments by the industry is given in Table 22. FSIS is reporting three values for the possible benefits derived from this rule: The median,

the 5th percentile, and the 95th percentile for each scenario (baseline, sanitation/FCS verification testing, *Lm* growth-inhibiting packaging (GIP) and post-lethality processing (PP) + GIP). This range of values represents the uncertainty in the true number of averted number of deaths per year. The reported results imply 90 percent certainty that the true value lies between the 5th and 95th percentiles. Each uncertainty distribution is the result of three hundred computer simulations, each simulation consisting of 100,000 iterations, of the FDA-FSIS risk ranking model. The risk characterization portion of that model comprises 4,000 combinations of the exposure distributions for the 23 different food groups in the FDA-FSIS risk ranking model. The median reports the mid-point value of deaths averted from these multiple computer simulations for each scenario. The median is reported because it is the preferred measure of central tendency in the FDA-FSIS risk ranking. Furthermore, the distribution of results suggests that the mean, as an alternative measure of central tendency, is less informative about the shape of the distribution because of the influence of outliers in its calculation. Illnesses are estimated using the standard .20 case-fatality rate commonly reported in the literature.

Table 22. Incremental Reductions in Deaths Due to Various Interventions (assuming 100% industry-wide adoption)

Scenario	Averted Deaths			Averted Illnesses		
	Median	5%	95%	Median	5%	95%
FCS testing /1	25 (24)	8 (8)	25 (24)	125 (120)	42 (40)	125 (120)
GIP	141 (135)	48 (45)	165 (158)	707 (675)	240 (225)	823 (790)
PP & GIP	238 (227)	77 (72)	272 (261)	1188 (1135)	384 (360)	1360 (1305)
/1 FCS testing at a 4-2-1 rate.						
/2 Numbers in parentheses exclude reductions in neonate deaths.						

The greatest reduction in listeriosis deaths and illnesses would occur if all establishments used both PP and GIP. However, 100 percent adoption is not possible for a variety of reasons, including technical—not all products are amenable to the use of PL or GIP—and economic—the costs are prohibitive in relation to the value of the product.

The analysis of costs described movements among establishment groups that are likely to occur as a result of the final rule. These movements are the basis for estimating the human health benefits of the final rule. Establishment group net movements are

placed on a percentage basis of establishments in each size class (Table 23). The absolute changes in establishment numbers are converted into percentage increases by dividing the number establishments estimated to adopt one or more measures by the total number of establishments in that size class. For example, 2 of the 42 large establishments producing deli meats (4.8 percent) are estimated to adopt PL and GIP measures. Next, the percentage change in establishments is weighted by the relative volume of deli meats produced by that size class. The two large establishments are

estimated to account for 2.3 percent of deli-meat production (4.8 times 0.48). The summation of these weighted percentages produces the percentage increase in that technology which is adopted as a result of the final rule. Thus, deli-meat producing establishments adopting PL and GIP represent a 5.4-percent increase in the amount of deli-meat production that is produced using this technology. Likewise, the percent increase in the amount of production using GIP and FCS sanitation/verification testing is 8.9 and 13.3 percent, respectively.