Comments by Amber Jessup on

“Measuring the Pain, Suffering, and Functional Disability Associated with Foodborne Illness”

(by Josephine Mauskopf and Roberta Morales)

1. I enjoyed the paper.

2. This paper dealt with a number of difficult problems. First, how to “count” the number of foodborne illnesses. Second, how to assess the impact of regulatory actions on the number of foodborne illnesses. Third, how to quantify pain, suffering, and disability associated with foodborne illness. Fourth, how to use quality-adjusted life years (QALY’s) to value pain, suffering, and disability.

3. The paper identifies two primary methods for counting the number of foodborne illnesses, a “top-down” and a “bottom-up” approach. The top-down approach takes the number of reported cases and multiplies it by a surveillance multiplier that accounts for non-reported cases; the bottoms-up approach takes exposure to the hazard and multiplies it by the probability of illness, given exposure. The top-down approach is limited by uncertainty surrounding the correct value of the surveillance multiplier. The multiplier should vary with how the case is observed, whether outbreak, passive, or active surveillance and the severity of the observed cases. The bottom-up approach is limited by its specificity. For example, a *Salmonella Enteritidis* risk assessment for eggs is only applicable for eggs and *Salmonella Enteritidis.* Each bottom-up analysis is a very difficult undertaking, which is limited by uncertainty about the prevalence of the bacteria, how the bacteria grows before consumption, the dose-response relationship, the susceptibility of different populations, food preparation practices, and the quantity of tainted food consumed.

4. For analysis of the economic impact of regulatory actions, the bottom-up approach can potentially be more useful. It allows the analyst to directly link illness to a food source and, ideally, each regulatory requirement can be linked to a reduction in illness. The top-down approach is helpful for assessing baseline levels of foodborne illness, but does not link illness to a particular food source. However, although often associated with the top-down approach, outbreak data can helpful for tying illness to specific food sources.

5. There are a number of methods commonly used to assess QALY’s.
   - *Rating Scale*—The rating scale asks consumers to rate the level of utility associated with condition A along a line between 1 and 100. The QALY associated with condition A is calculated by a linear transformation.
   - *Time Trade-Off*—Time trade-off asks an individual what number of years at full health is equivalent to some other number of years with condition A. The QALY associated with condition A is the number of years in full health divided by the number of years with condition A.

- *Standard Gamble*—Standard gamble offers two alternatives to an individual, a number of years in full health with some probability of death, or the same number of years with condition A. They are then asked what probability of death would make them indifferent between full health with a chance of death and the same number of years with condition A. The QALY is the acceptable probability of death.
- *Expert Opinion*—Health care professionals offer their opinion on the QALY loss associated with condition A.
- *Multivariate Analysis*—Multivariate analyses of large data sets can be used to estimate the marginal effect of a given condition on a health status. The results of these analyses can then be adjusted to represent a QALY value. A fully specified model requires data on self-perceived health status, activity limitations, other illnesses, and basic demographics. This method corrects a number of shortcomings of the other methods. For example, responses may be colored by individual characteristics, be based on indirect knowledge of the condition, be strategic responses, and reflect embedding in the other methods. Using large surveys, such as NHIS, it is possible to control for individual characteristics and other conditions. However, this method shares some of the limitations of other approaches. The primary limitation is that the interpretation of self-perceived health status varies by individual. For example, blind persons may perceive themselves as in full health.