

ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD

Salmonella in eggs risk assessment model

Introduction

1. In the ACMSF's 2nd report on *Salmonella* in Eggs 2001, the Committee considered a risk assessment model developed by the Department of Health with input from members of the working group. The report welcomed the development of the model and set out a number of recommendations for its future development. Some of these recommendations have been taken forwards by the Food Standards Agency and this has resulted in the development of an in-house exposure assessment model to inform risk management decision making.

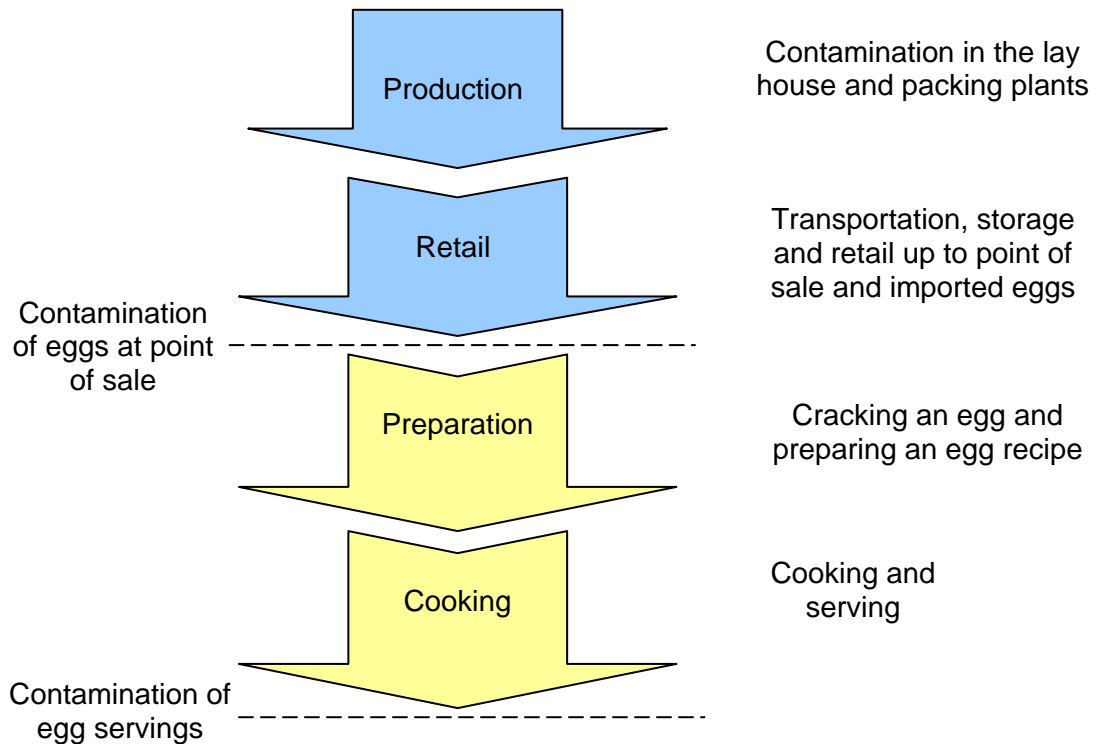
Background

2. A *Salmonella* in eggs risk assessment model was developed by the Department of Health (DH) in 1999/2000 to support the ACMSF in its work in this area. The Committee's 2nd report on *Salmonella* in eggs in 2001 recommended that more empirical data was required to support the further development of such a model. Since 2001 more information has become available particularly on *Salmonella* in laying flocks, prevalence of *Salmonella* contamination in UK and non UK eggs. The Food Standards Agency has used some of this data to populate and further develop the model as well as running a workshop with experts to obtain their opinion to help bridge key data gaps.

The model

3. The DH Model that featured in the 2nd *Salmonella* in Eggs Report was a farm to fork deterministic exposure assessment model, developed following consideration of the USDA model for *S. Enteritidis* and eggs - see the following links for further details concerning the USDA Model (<http://www.fsis.usda.gov/ophs/risk/contents.htm> and http://www.fsis.usda.gov/Science/SE_Risk_Assessment_Model/index.asp).
4. The FSA has developed the DH deterministic model further into a probabilistic model using Monte Carlo simulation to model uncertainty. The model estimates the prevalence of *Salmonella* contamination at each step in the food chain from farm to fork (as illustrated in Figure 1) by compounding probabilities of cross contamination at each stage. This provides for two key outputs:
 - Probability of eggs being contaminated at point of sale
 - Probability of an egg based meal/dish being contaminated at point of consumption.

Figure 1 - Structure of the *Salmonella* in eggs model



5. The model draws on a range of data sources including FSA egg survey results, and findings from DEFRA research projects with remaining data gaps having been addressed using expert opinion. The predicted prevalence of contaminated eggs at point of sale has been validated against findings from the Food Standard Agency's 2003 UK retail egg survey. The model has also been peer reviewed by the Veterinary Laboratories Agency Centre for Epidemiology & Risk Analysis.

Risk Management

6. The *Salmonella* in eggs model can be used as a risk assessment tool to inform risk management. The levels of contamination can be assessed with a view to mitigating them through various interventions. In particular the model can be used to:
 - Identify the riskiest part of the food chain.
 - Test the impact of different interventions singly or in combination.
 - Test the impact of different future scenarios, for example what is the impact on contamination if only one production type of eggs were consumed.
7. The Committee is asked to **note** the further development of the model which was recommended in their report and the potential for using the model as a tool to inform risk management.

**Secretariat
March 2009**