

Salmonella: Perception Versus Reality

Good hygiene and biosecurity measures will not only benefit production performance but will help reassure consumers of the industry's concern for their interests. Public education and training food service personnel is also needed.

Since a widely circulated, and heavily publicised, article appeared in the Journal of the American Medical Association, in April 1988 (St. Louis et al, JAMA, vol.259,pp2103-2107) the egg industries of much of Western Europe, North America, and several other parts of the world, have been thrown into confusion. The original report, based on data gathered at the Centers for Disease Control, in Atlanta, Georgia, showed that the incidence of Salmonella enteritidis in cases of human Salmonellosis had shown a steady increase over the period 1976-86, and that a disproportionate number of cases appeared to involve Grade A shell eggs where the food vehicle could be positively identified.

This created justifiable concern within the egg industry, since it had been almost universally believed that Salmonella should not be a problem in shell eggs, provided they were hygienically produced, and subject to normal sanitation and handling.

The report also suggested, without any real evidence being presented, that trans-ovarian transmission of the Salmonella organism might be responsible for this apparently new phenomenon.

At this point, the American egg industry initiated research in several areas, designed to identify, and, if possible, quantify the problem. Several surveys were conducted, primarily in the North-eastern states, where the incidence of human cases appeared to be concentrated. These suggested that the incidence of naturally infected hens was extremely low: indeed so few were found that one might have concluded that no

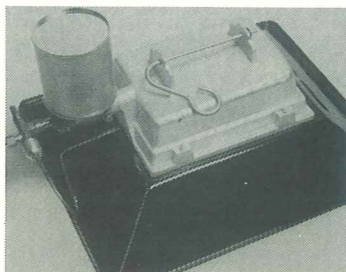
problem existed. However, human cases of S. enteritidis food poisoning continued to occur, and to be linked with eggs as a suspected vehicle. Other research showed that, while trans-ovarian transmission might be possible, it was difficult to demonstrate in the laboratory. Even when hens were artificially infected, they did not necessarily transmit the organism to any or all of their eggs.

In the last two months of 1988, the British egg industry endured what turned out to be the greatest catastrophe in its history. A badly informed politician announced on TV that "most of the country's egg production is - infected with Salmonella" and egg sales fell by 50 or 60% overnight. While the incidence of S. enteritidis in cases of human Salmonellosis had shown increases in Great Britain, similar to those in the US, and had also been associated with egg-containing foods, there was no truth in this politician's statement, and she subsequently was forced to resign. However, the damage, to the egg industry, was done.

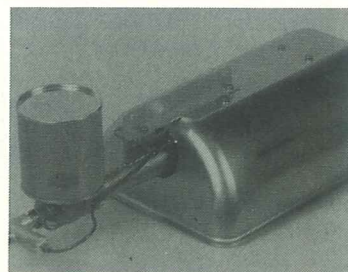
Surveys of British egg production flocks, like those in the North-eastern states, failed to identify culprit flocks or individuals. Nevertheless, at the urging of public health and other authorities, a massive and extremely expensive programme of flock testing was made mandatory, in an attempt to reduce the level of S. enteritidis entering the human food chain. Suspect flocks are slaughtered, with government compensation, but all testing is at the expense of the individual producer. A voluntary programme has been introduced by some States in the US, which may become universal, involving testing of trace-back flocks and diversion of eggs to pasteurisation, but there is no element of compensation, either public or private.

If these facts were all that contributed to the so-called 'Salmonella scare', the egg industry would have little to worry about. But, as usual in these times, it is not just the facts that create the story. News-hungry reporters on both sides of the Atlantic have embellished the facts to an alarming degree. Poorly researched, but widely

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disseminated media coverage has created a level of consumer fear which is quite unrelated to the reality of the situation.

Public health authorities have a right to be concerned for the safety of consumers, but they also have a responsibility to acquaint themselves with all the facts, and not just the outpourings of popular media, always alert to potential sensation. I have personally heard a public health official of high standing assert that the incidence of *S. enteritidis* infected eggs was one per thousand. Another case of which I am personally aware involves a doctor who, on investigating a case of Salmonellosis in an infant, concluded that eggs fed to the child were responsible, as soon as he was told that cracked eggs had been used. While we would all agree that using cracked eggs in this case is lamentable, the public would be better served by a more thorough investigation. What else did the child consume? Why were other members of the family not ill, and should they not have been investigated as possible carriers?

Recommendations issued by some agencies for the cooking of eggs to ensure Salmonella are killed, lead consumers to believe that most, or even all, eggs are contaminated. Let's review, once more, the salient facts.

The Facts

1. *S. enteritidis* has emerged as a proportionately greater contributor to human Salmonellosis in some countries, notably Great Britain and the US. (Interestingly, it still ranks a distant third, with less than 10% of cases, in Canada).
2. Certain phage-types (sub-serotypes to the initiated) predominate in some countries but not in others. For example, phage-type 4 accounts for almost all *S. enteritidis* cases in Great Britain, but is rare in the US and Canada. Phage types 8 and 13A predominate in the US.
3. More cases of *S. enteritidis* in humans than hitherto have been traced to foods containing eggs, usually uncooked or partly cooked. The great majority of these involve food prepared outside the home, and frequently are associated with poor hygiene and/or handling practices.
4. The incidence of naturally infected eggs is low. Once published estimate in the US suggests that even in 'high incidence areas' less than one egg/10 000 would be naturally infected. A 1989 survey involving 300 flocks in Canada led Agriculture Canada to conclude that less than one egg in a million would be infected.
5. The natural defenses possessed by the egg mitigate strongly against either widespread infection or multiplication of the organism in the intact egg.

Thus, the REALITY is that the risk to a consumer of being infected with *S. enteritidis* as a result of eating eggs at home is almost zero. The risk is increased somewhat when food is consumed outside the home, but remains extremely low when compared with many others to which consumers expose themselves in their daily lives.

What Does The Egg Industry Do Now?

Given the scientific knowledge currently available, the eradication of any Salmonella species, particularly one as ubiquitous as *S. enteritidis*, is not feasible in the short term. With the recognised low initial incidence, even to reduce it by one half would be difficult. And, even if this were possible, there is no assurance that such a reduction

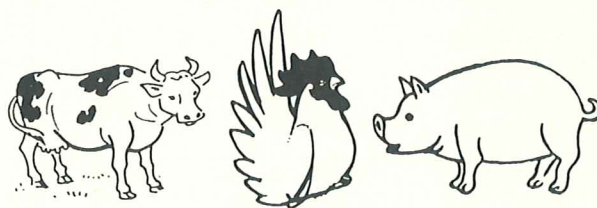
among laying hens would be reflected in a lower number of outbreaks in the human population.

However, industry must not, under any circumstances, appear to 'walk away' from the problem. Public awareness of industry's efforts to contain the problem will be extremely important. The practice of good hygiene and biosecurity measures is of benefit to producers in terms of better production, and in addition, it reassures consumers of the industry's concern for their interests.

The certification of breeding stock as *S. enteritidis*-free at the primary, grandparent and parent levels is entirely possible in the reasonably near future. This, if seen to be effective, is a further step to maintain consumer confidence. The practice of quality assurance in the feed industry is another important part of this process.

All of these steps improve the PERCEPTION of the egg industry as a responsible producer of a safe, high quality food.

The way for real progress to be made in the public health area is to ensure much improved care in the handling, preparation and serving of all foods outside the home, including those containing eggs. Public education, and especially the training of food service personnel, can make a major contribution here, but the challenge is at least as great as the one facing the poultry industry.—*Dr Peter Hunton, Poultry Specialist, The Ontario Egg Producers' Marketing Board, Canada.*



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