

# **Report of the Task Force on Zoonoses Data Collection on the Analysis of the baseline study on the prevalence of *Salmonella* in holdings of laying hen flocks of *Gallus gallus*<sup>1</sup>**

(Question N° EFSA-Q-2006-039)

**Adopted by  
The Task Force on 20 February 2007**

## **Summary**

*Salmonella* is an important cause of foodborne disease in humans throughout the world and is a significant cause of morbidity, mortality and economic loss. Hens' eggs which are derived from flocks infected with *Salmonella* Enteritidis are an important source of this serovar. *S. Enteritidis* is the serovar which causes more than 50% of human infections with *Salmonella* in the European Union<sup>2</sup>. The second most reported serovar in humans is *S. Typhimurium*, which is less often associated with the consumption of hens' eggs.

The European Union has agreed a programme for the reduction of *Salmonella* of public health significance in farm animals under Regulation EC No 2160/2003. In order to provide the scientific basis for setting targets for *Salmonella* in laying flocks of *Gallus gallus*, a European Union-wide baseline study to determine the prevalence of *Salmonella* was conducted on commercial large-scale laying hen holdings with at least 1,000 laying hens on the holding. This study was the first of several baseline studies organised at the European Community level.

The sampling of the holdings took place between October 2004 and September 2005. Five faeces and two dust samples were taken from flocks of laying hens during the last nine weeks of their production. A total of 5,310 holdings with validated results were included in the study analyses.

*Salmonella* was detected in 30.8% of the laying hen holdings in the European Union. In the specific Member States, the observed holding prevalence of *Salmonella* ranged from 0% to 79.5%. A total of 20.4% of the laying hen holdings was positive for *S. Enteritidis* / *S. Typhimurium*. The Member State-specific observed holding prevalence of *S. Enteritidis* / *S. Typhimurium* varied greatly, from 0% to 62.5%. The prevalence of *Salmonella*, especially *S. Enteritidis*, was greater than that predicted by existing routine surveillance in most Member States.

Due to the design of the study, which resulted from the pragmatic decision to sample only one flock per holding, the true holding prevalence is likely to be higher than the observed, as some of the holdings detected negative may house one or more positive flocks that were not sampled and hence not detected. Moreover, the design of the study did not allow the flock prevalence to be estimated without additional information.

The number of positive samples in a *Salmonella* positive holding varied between one and seven but 38% of those positive holdings was found positive on the basis of only one or two *Salmonella* positive samples.

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<sup>2</sup>The Community Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents, Antimicrobial Resistance and Foodborne Outbreaks in the European Union in 2005, *The EFSA Journal* (2006) 94.

The three most frequently isolated *Salmonella* serovars in the European Union were *S. Enteritidis*, *S. Infantis* and *S. Typhimurium*. *S. Enteritidis* was by far the most common serovar and it was detected in 60% of the *Salmonella* positive holdings.

Vaccination of the hens in the flock against *Salmonella* was associated with a lower risk of being *Salmonella* positive, except for holdings infected with *S. Typhimurium*. In Member States with an intermediate *S. Enteritidis* holding prevalence (2.5%-15%), vaccination also seemed less important for the *S. Enteritidis* status of the holding.

Cage production was found to be associated with a higher risk of positivity than for the other investigated laying hens production types. However, compared to the other production types, cage production was characterised by larger flock sizes. Organic flocks were on average of the smallest size, whereas the barn and the free-range standard flocks were of low to medium size. Consequently cage production as well as a larger flock size were associated with a higher risk of positivity. But it was not possible to determine which of these two factors was a true risk factor for positivity.

Potential factors associated with prevalence of serovars other than *S. Enteritidis* and *S. Typhimurium* were numerous, including the seasonality.

There were indications that factors associated with *Salmonella* prevalence may depend on the specific *Salmonella* serovar epidemiology. *S. Enteritidis* and *S. Typhimurium* showed no evidence of seasonal variation, whereas serovars other than *S. Enteritidis* and *S. Typhimurium* peaked in autumn months. There were also differences between the factors associated with *S. Enteritidis* positivity and those associated with *S. Typhimurium* positivity.

Overall, dust samples were twice more likely to be positive than faeces samples, indicating that sampling of dust is a more sensitive method for detecting *Salmonella* in a laying flock environment.

The phage typing and antimicrobial susceptibility testing information reported was not representative of the whole of the European Union. The distribution of reported *S. Enteritidis* phage types resembled that of human *S. Enteritidis* infections. The observed proportions of *Salmonella*-positive laying hen holdings with resistant isolates were in general low.

In the future baseline studies, improved validation during the data submission period would streamline the reporting and analyses. Also making the reporting on antimicrobial resistance and phage typing obligatory would provide for more representative information. Further studies on risk factors are needed to confirm the results regarding factors related to *Salmonella* positivity.