

# Salmonella control in the US and Europe: successes and improvements

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Zoonotic diseases are a major global concern as they are not only affecting food producing animals but are compromising human health as well.

Salmonellosis and campylobacter are the main human zoonotic diseases in Europe and the US, with salmonella having just below 100,000 reported cases annually in Europe.

While the human cases of salmonellosis are showing a downward trend (-8.8% 2010 vs 2009), campylobacter is on the rise with an increase (+6.7% between 2009 and 2010).

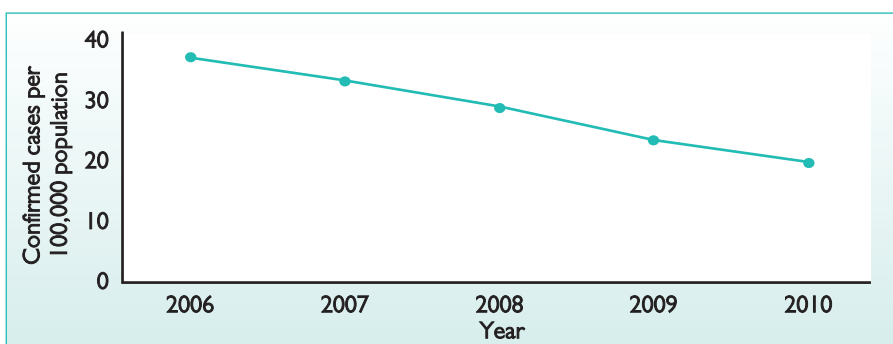
Salmonella enteritidis (SE) and Salmonella typhimurium (ST) represent 67% of the human salmonellosis cases in Europe. Poultry meat and eggs prove to be the main factors for human salmonellosis cases.

Annually in the US, approximately 42,000 cases of salmonellosis are reported. Because many milder cases are not diagnosed or reported, the actual number of infections may be many times greater. The main serovars found are Salmonella typhimurium or Salmonella enteritidis. More recently there have been cases of Salmonella heidelberg traced back to poultry meat in the US.

## Control in poultry

The control of salmonella in poultry is not an easy task, since there are three main factors to be considered:

**Fig. 1. Trend in reported confirmed cases per 100,000 population of human salmonellosis in the EU, 2006-2010.**



**Recall notice due to egg contamination with salmonella, August 2010.**

### ● Biosecurity:

Control of farm hygiene, feed, water and especially rodents as these can be the main sources of infection. Good biosecurity starts with the simplest of lists, noting feed, water, personnel, insects, rodents, etc moving in or out of the house followed by a list of actions to reduce the risk of salmonella infection at these points.

### ● Monitoring and sampling:

It is imperative that a layer or broiler flock has to be free of at least SE and ST and, in the case of breeders, other salmonella serotypes need to be controlled as well. Increased sampling of the environment, inside the house, for example by boot swabs, and the surrounds of the farm will indicate if the flocks are salmonella positive.

### ● Vaccination:

The use of inactivated or live vaccines to control salmonella are used increasingly throughout the world as they have been proven to be an important step in reducing

the shedding of salmonella from bird to bird and flock to flock. Other intervention methods used are feed additives and water treatments, etc.

The control of salmonella became important at the end of the 1980s in the UK when there was a significant increase in human salmonellosis cases which were linked back to contaminated eggs.

This egg scandal almost destroyed the British egg industry and led to the renewed implementation of the Lion Code in 1998. An important part of this Lion Code is enforced vaccination and improved regulation on biosecurity and monitoring.

## Increased regulation

The human salmonellosis cases and other zoonotic diseases in the EU and US have triggered strong regulations and goals to reduce salmonella levels in poultry flocks. Specific regulations are currently in place in the EU to reduce levels of salmonella in broilers, layers, breeders and turkeys. The regulations are based on increased sampling during the production and rearing period of poultry by using environmental samples as the reference.

## US situation

The history of salmonella control in the US started in the mid 1990s when some states were introducing a salmonella control program on egg production farms.

The NPIP (National Poultry Improvement Plan) standards for Salmonella pullorum control were introduced in the 1930s and were later expanded to Salmonella typhimurium (1970s) and Salmonella enteritidis (end of 1980s).

## Regulation in the US

In the US there were national health objectives set for 2010 and 2020 focusing on reducing the incidence in humans, leading to strict regulation on egg production farms and processing plants.

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In 2009 the FDA (Food and Drug Administration) issued a rule for the 'Prevention of Salmonella Enteritidis in Shell Eggs', while the FSIS (Food Safety Inspection Services) issued the 'Pathogen Reduction; Hazard Analysis and Critical Control Point (PR/HACCP) Systems, Final Rule' in 1996. Both regulations are strictly checked by the FDA and FSIS and have had a big impact on the US poultry industry.

Just after the introduction of the regulations for egg producers, the US egg industry was affected by the salmonella contamination of eggs in 2010, which further increased the interest in a detailed salmonella control program in which vaccination plays an

important role. In 2012 there were several cases of salmonella contamination from live poultry in the US, and at the same time there was increasing concern for Salmonella heidelberg in the US egg industry.

### European regulation

In 2004 and 2005 the European Food Safety Authority (EFSA) carried out baseline studies to determine salmonella contamination levels in each European Member state. This baseline study showed detailed information on salmonella levels in broilers, layers, breeders and turkey flocks.

The EU directive 2160/2003 has a target

to reduce salmonella levels in poultry, and prescribes targets for maximum salmonella levels in broilers, layers, breeders and turkeys.

From this directive other regulations have emerged which go into detail on the sampling protocols.

These specific directives have also set clear goals for an annual reduction in salmonella levels on the basis of the study.

Each member state in Europe has to set up specific National Control Plans (NCP) to address how to comply with the EU directives.

The EU directive focuses on the reduction of Salmonella enteritidis and Salmonella typhimurium in broilers, layers and turkeys. Breeders have to reduce the levels of the above mentioned salmonella serovars and also Salmonella hadar, Salmonella infantis and Salmonella virchow.

The implementation of these regulations has had a strong effect on decreasing flock contamination with salmonella and consequently in meat or eggs.

As a result, human salmonellosis cases have decreased and salmonella in poultry dropped significantly (-55% over a five year period).

### Success factors

- In Europe there have been many years of experience in salmonella control, while in the US there was experience in several states. More recently the new regulations will have a beneficial effect and will accelerate the learning curve.
- Regulations which are in place are working towards reducing salmonella levels in poultry and humans.
- In Europe the focus is on SE and ST, but other salmonella serovars are measured. In breeders, EU targets have been set for S. hadar, S. virchow and S. infantis as well. In the US there is an increased concern over S. heidelberg.
- Feed formulas are adapted:
  - No products of animal origin allowed.
  - Feed can be acid or heat treated.
- Funding is available for vaccination costs and reimbursement of eradicated flocks in some cases.

### Desirable improvements

- As a salmonella outbreak has a strong effect on the public image or brand of the producer, more companies should invest in a fast acting tracking and tracing system. The response time is crucial in case of a recall action for preserving the brand's name.
- Increasing biosecurity at all levels (hatchery, farm, processing) still needs further attention.
- Sampling protocol allows sampling to be done by the operator, which allows room for different interpretation of the results. This should be addressed. ■

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