Poultry Veterinarians and Pre-harvest Food Safety Risk Management – Past, Present and Future

Zheko Kounev, DVM, Ph.D. - ADDL/ School of Veterinary Medicine/Purdue University, Indiana, U.S.A.

The modern poultry industry produces meat more economically, in a shorter time, in less house space, with less feed, energy, and labor than ever before. Since 1990, average bird weight increased from 4.39 pounds (1.98 kg) to 5.23 pounds (2.36 kg) which is a 19% increase. At the same time the average age for processing decreased from 48.9 to 47.69 days (Agri Stats, Inc). Actual live cost decreased from 26.54 cents per pound in 1980 to 24.23 cents in 2002 (Agri Stats, Inc.).

In many countries in the world, food safety of poultry remains a serious problem. Each year, an estimated 76 million people experience food borne infections in the United States, causing 325,000 hospitalizations and 5,000 deaths (Mead at al., 1999). Food borne illnesses from S. enteritidis in eggs alone are estimated to cause 182,060 cases in the United States during year 2000 (Schroeder, C. et al, 2005). Data from national surveillance system in England and Wakes revealed that from 1996 to 2000, an estimated 1,724,315 cases of indigenous food borne diseases per year resulted in 21,997 hospitalizations and 687 deaths (Adak, G., 2005).

Food safety and food control have been recognized as important issues worldwide. For more than a century, developments in food animal production and new control approaches have contributed to new food safety systems in most developed countries considered by many to be effective in the reduction and prevention of food borne diseases.

Despite these advancements, there remain issues needing attention, particularly the food borne diseases caused by pathogenic bacteria (WHO, 2002a). Laboratory-based surveillance may not be employed throughout the entire food production chain. There is a need to combine food borne pathogen surveillance with animal production monitoring programs and technology in an integrated approach. These data are crucial for food safety risk assessment (WHO, 2002). Within the European Union, the so called European Food Safety Authority (EFSA) has been created to direct the following activities: A). national control plan in every member state; B). contingency plans for emerging crisis; C). emerging power for the EU Commission; D). rapid alert system for food and feed (D. Byrne, 2005).

The poultry industry in the United States has been and is still under dynamic and progressive development. Although significant advances in the fields of genetics, nutrition, veterinary biologicals and growing technologies have been made, the issue of food borne pathogens remains. The introduction of HACCP at poultry processing plants has been successful, but has obviously certain limitations. As a result, the USDA/FSIS is shifting its control from poultry processing plants to the farm level in order to realize a comprehensive food safety control from the farm to the consumer’s table. Unfortunately there is no consistent pre-harvest food borne pathogen control procedures included in current poultry growing technologies. Except for the use of antibiotics through the feed to promote growth and through drinking water to control morbidity/mortality, no other procedures have been implemented to control food borne pathogens. Since the future of antibiotic use is uncertain, some bioproducts such as prebiotics, probiotics,
yolk-derived antibodies, oxy-halogenic and ionic compounds, chemicals for feed treatment, herbs and herb extracts are used on a limited basis.

Poultry veterinarians have the primary responsibility for disease prevention and control. The role of the poultry veterinarian regarding pre-harvest food safety has remained the same for the last half century. Unfortunately, veterinarians do not generally play a decision-making role in the development of the poultry industry, even though it is the veterinarian who is likely to recognize problems such as concentrated poultry production farms in restricted geographical areas which can lead to poultry health, food safety, environmental, and human health problems. The prevention of such problems must include the integration of the entire poultry production chain, recognizing that the critical point for effective prevention might be at the farm level, the processing level, the retail level, or other links in the production chain. Most current food safety systems are not organized according to this important principle which may explain their inconsistency and ineffectiveness (Schlundt, J., 2002). The present and future role of the poultry veterinarians should not be to organize poultry pre-harvest food safety systems and be responsible for this, but to participate along with others to realize a new effective integrated approach within the food safety system.

We would like to share our experiences with a new approach to the pre-harvest control of *Salmonella enteritidis* at poultry companies in Indiana, USA (Kounev, Zh., 2004). We developed and introduced an Integrated Food Safety Risk Management System (IFSRMS) to control *S. enteritidis* at production and processing lines of poultry companies.

The system is managed by an IFSRMS Committee which includes:

- Executives of live production, processing/further processing and marketing and sales;
- Managers of the breeder department, live production, hatchery, processing plant, QA/QC, feed mill, veterinary services, nutrition and laboratory (ies).

The leader of the IFSRMS Committee is appointed by the President of the company for a two or three year period. This limited appointment term is an important step that will ensure integrated line management, gaining cross training and experience at all levels of production. Such an approach builds and accumulates knowledge and experience for the entire workforce that is maintained within the team and not solely within the experienced individuals.

The IFSRMS integrates all links of production and processing lines with the option to include the distribution chain. The system is designed to fit with the current organization and structure of the specific poultry company. Once developed and introduced, the system will assist company management in controlling food borne pathogens in the entire production and processing chain. The IFSRMS is a line management responsibility; it must not be delegated only to veterinarians and technical personnel. The IFSRM system includes HACCP, but food safety risk management is an effective activity with focus on food borne pathogens (SE); and is not merely a paper-generating exercise.

The IFSRMS Committee has well defined tasks and responsibilities. Food safety policies and internal company standards are the responsibility of the senior management. Policies must include clear responsibilities and procedures to ensure that food safety is the main objective of integrated line management and must be clearly distinguished from the role of the veterinarian, QA/QC specialist, or microbiologist, who are in the team to support line management in the execution of their responsibilities.
Training and cross-training of the entire workforce is a necessity. The IFSRM System requires a multi-level internal and external audit approach.

IFSMS Committee management tools include:
A) Laboratory-based surveillance on all links of the production, processing and further processing chain.
B) Microbial risk assessment (Hazard identification, Exposure assessment, Hazard characterization, Risk characterization - CAC, 1999)

As a result of the implementation of IFSRMS to reduce and eliminate S. enteritidis in commercial duck production we achieved the following results:

- Year 1999 = 3.2% positive samples tested (n = 2,750)
- Year 2000 = 1.3% positive samples tested (n = 2,901)
- Year 2001 = 0% positive samples tested (n = 3,385)
- Year 2002 = 0% positive samples tested (n = 3,500)

n = number of samples submitted
The following were tested for SE: genetic pure lines, breeders, egg shell, early dead embryos, day old ducklings, chick trucks, nurseries, feed and feed ingredients, processing plants (Z Kounev, 2004).

In conclusion, the ultimate goal of poultry food safety systems remains public trust and confidence. Interdisciplinary collaboration in food safety between poultry producers, poultry processors, retail markets and consumers is an emerging necessity. International standardization of food safety procedures, increased private sector accountability and more stringent regulatory controls will increase the effectiveness of the IFSRMS. The poultry veterinarians, along with technical personnel and company management, have important new roles within the IFSMS with special emphasis on pre-harvest food safety.
References:

Agri Stats, Inc. 6510 Mutual Dr., Fort Wayne, IN, U.S.A.


