

# Canada's *Salmonella* situation

For more than 50 years, the Canadian poultry industry has been working to reduce, and ultimately eliminate *Salmonella* in Canada – a major cause of human foodborne illnesses. *Salmonella* enteritidis is the most prevalent and challenging type, and Martine Boulianne, Full Professor, Chair in Poultry Research, Faculté de médecine vétérinaire, Université de Montréal, has dedicated most of her research career over the past 25 years to studying the bacterial disease.



**Martine Boulianne**

“Reducing the incidents of *Salmonella* has generated a lot of interest over the years, beginning in Canada in the 1970s when the federal government wanted to make Canada *Salmonella*-free,” explains Boulianne. “We’re not there yet, but over the years, research into eliminating and controlling the bacteria has evolved and we’ve seen some success in vaccinations and control programs.”

During the 1996 *Salmonella* outbreak in Quebec, Boulianne participated in the surveillance program, providing support to the provincial egg industry. As a result, monitoring programs and control measures to eliminate infected laying flocks were put into place in Quebec in 1997 and have since been nationalized. “That means it’s safe to eat sunny side eggs in Canada,” notes Boulianne.

Since then, various prevention and traceability programs have been implemented across Canada as control measures against *Salmonella*. Food recalls are now easier with traceability programs and ongoing research has led to the development of vaccines to reduce bacterial excretion in live animals. “We haven’t found a silver bullet solution to stop animals from excreting and spreading *Salmonella* yet,” says Boulianne. But progress continues – a recent federal study revealed that approximately 15 per cent of Canadian broiler chickens currently test positive for *Salmonella*. “The good news is that vaccination can reduce the levels of *Salmonella*. It’s also worth noting, that even though Canadian flocks aren’t *Salmonella* free, there is minimal risk to people consuming poultry or egg products that are handled and cooked properly.”

## Taking control

For years, government monitoring programs have surveyed geographical and temporal trends in *Salmonella* infections and serotypes in Canada. The recent use of whole genome sequencing can establish the chronology of an outbreak and even trace sources of contamination. “Years of research has shown us how the bacterial disease is transmitted, how to monitor it and how to control it. Now public health officers and researchers have access to genomic tools which can not only confirm transmission schemes but eventually lead to the development of new control methods,” says Boulianne.

When it comes to controlling *Salmonella*, there are currently two opportunities in poultry production: pre- and post-harvest control measures. Any prevention or reduction measure taken before an animal is slaughtered, like vaccination, is considered pre-harvest. Foodborne pathogens occur post-harvest, but there are treatments available at the slaughter stage to control *Salmonella*. Boulianne says that it is essential control measures are taken at both pre- and post-harvest stages to reduce foodborne illness in Canada.

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## A global perspective

Canada isn’t the only country tackling *Salmonella*. Many countries are taking their own approach to reduce the bacteria entering the poultry value chain. Boulianne notes that the European Union restrict post-harvest treatments and is focusing on pre-harvest prevention. “Sweden has long been a leader and is constantly working to produce *Salmonella* free flocks in their country,” she says.

The Canadian poultry industry is working closely with researchers, government and public health officials to set new *Salmonella* targets and regulations. Boulianne is part of a national working group to reduce infection rates over the next five years.

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### The road of research

Bringing years of experience and historical knowledge to *Salmonella* research, one of Boulianne's recent research projects focused on the development of a *Salmonella* enteritidis vaccine for layers and breeding hens. Funded through the Canadian Poultry Research Council, the results saw the development of preventative tools that, with further research and development, could reduce the excretion of *Salmonella*. Through her research, Boulianne

developed a new vaccine delivery method for laying hens by inoculating the birds early in their growth stage. She also selected several protein candidates that could be used in the development of new vaccines. While nothing has been commercialized, these results offer new insight and building blocks to expand the development of new *Salmonella* vaccines and delivery methods.

Looking ahead, Boulianne says there is still plenty of research to be done identifying bacterial proteins and improving vaccine delivery. “And we can't forget other control measures like monitoring, testing and traceability – they are just as important and can be improved.”

Boulianne has invested much of her professional career to *Salmonella* research, and while she's seen significant progress in reducing the incidents of foodborne illness and number of infected flocks, she says there's still work to be done. “With proper measures in place and the joint efforts of industry, government and academia, we have a good chance of controlling the bacteria, but we still have many questions to answer.”

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