



The results of this project suggest that the chilling process is a crucial point of *Salmonella* contamination and cross-contamination during chicken processing. A developed qualitative map for tracking the distribution of *Salmonella* in chicken will give poultry processors more information regarding effective intervention strategies to remove or eliminate *Salmonella* from chickens during commercial processing.

## Molecular Characterization and Predictive Modeling of *Salmonella* Recovered from Processed Poultry

### Who cares and why?

Salmonellosis is a worldwide health problem and *Salmonella* infections are the second leading cause of bacterial food-borne illness in the United States. Approximately 3 to 10% of reported cases result in bacteremia requiring treatment with antibiotics. Food of animal origin, especially poultry and poultry products, has been implicated in outbreaks of human salmonellosis. However, information is limited about the molecular characterization and predictive modeling of antibiotic resistant *Salmonella* recovered from pre- and post-chill carcasses. Moreover, there is lack of knowledge about the distribution of *Salmonella* contamination on the chicken carcass, especially for young chickens in the Cornish game hen class. The overall goal of this project was to address these data gaps which are critical to understand the sources and control of *Salmonella* in poultry.

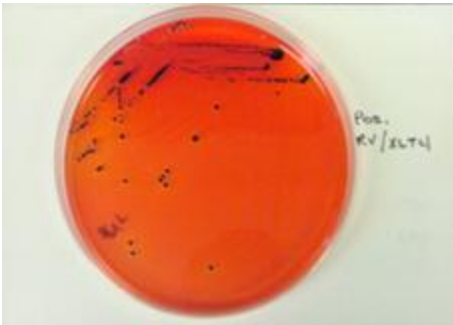
### What has the project done so far?

Molecular typing was conducted to evaluate the distribution of antibiotic resistance genes, virulence properties, and clonal diversity of *Salmonella* recovered from processed poultry. A qualitative map of the distribution of *Salmonella* on the carcass of young chickens in the Cornish game hen class was developed to improve poultry inspection and application of interventions to reduce or eliminate *Salmonella* from the chicken carcass.

Over the last five years, researchers and students at the University of Maryland Eastern Shore (UMES) worked closely with scientists and technicians at the United States Department of Agriculture's Agriculture Research Service (USDA-ARS) and the U.S. Food and Drug Administration (FDA) to accomplish the objectives of this project.

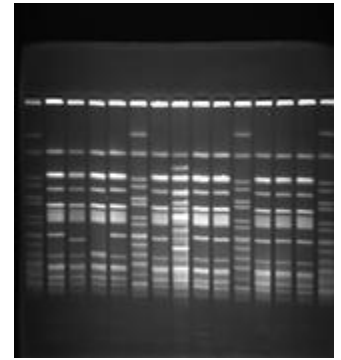


Chicken parts for mapping *Salmonella* contamination.



*Salmonella* on selective medium

During this project, scientists trained 10 educators/scientists, 12 graduate and seven undergraduate students, one technician, and one research specialist in the distribution, sources, and control of *Salmonella* in chicken. Results of the project were shared with the undergraduate and graduate students at UMES, the poultry industry, the Maryland health department, and the scientific community through classroom discussion, personal communication, published papers, and oral



Molecular typing of *Salmonella*

and poster presentations.

## Impact Statement

The results of this study indicated that chilling impacted the recovery of particular *Salmonella* clonal groups but had no bearing on the prevalence of antibiotic resistance genes and virulence factors.

Molecular typing results confirm that the chilling process is a crucial point of *Salmonella* contamination and cross-contamination in the chicken processing procedure.

The results of the chlorine inactivation study indicated that expression of an antibiotic resistance phenotype does not confer cross-protection in *S. typhimurium* and *S. kentucky* to chlorine inactivation in chilled water.

The developed quantitative map allows poultry inspectors to better target sampling efforts to detect *Salmonella*, making it a valuable food safety tool in the poultry industry.

## What research is needed?

To better understand the sources and control of *Salmonella* in poultry, future research is needed in the development of a quantitative map of the distribution of *Salmonella* on carcasses of chicken and application of biocontrol agents for reducing *Salmonella* on carcasses.

## Want to know more?

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**Strategic Priority:** Safe and Secure Food Supply

**Additional Links:** <http://www.umes.edu/ard/Default.aspx?id=46285>

**Year and Institution:** 2014, University of Maryland Eastern Shore

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