

Antimicrobial Resistance Monitoring: Expanding FSIS Surveillance

The National Antimicrobial Resistance Monitoring System (NARMS) is a surveillance program run by the U.S. Department of Agriculture's Food Safety and Inspection Service (FSIS) and public health partners. NARMS provides information about emerging bacterial resistance.

In 2020, we expanded NARMS sampling to include mesenteric lymph nodes (MLN) in cattle and intestinal (also called cecal) sampling in sheep, goat, lamb and veal. We also added other bacterial analyses to the existing *Salmonella* testing for Siluriformes fish (types of catfish).

We started sampling cattle MLN to see if there were any *Salmonella* serotypes with antimicrobial resistance (AMR) that were not seen in the ongoing NARMS cattle cecal sampling. To do this, FSIS public health veterinarians collected cecal content and MLN samples from the same animal (i.e., paired samples) and submitted these to the FSIS labs for testing. Preliminary findings indicate that 14.65% (63/430) MLN were positive for *Salmonella*. Of the 63 *Salmonella* recovered from MLN, 11 matched the serotype of the paired cecal sample and four pairs were closely related genetically, as determined by whole genome sequencing technology. Only three MLN *Salmonella* isolates (out of 63) exhibited AMR and their profiles were identified as multidrug resistant (MDR) (resistant to 3 or more types of antimicrobial drugs). The types of AMR seen in MLN *Salmonella* serotypes were no different from those found in cattle cecal contents, so we decided to end MLN sampling in October of this year.

When we tested *Salmonella* in Siluriformes fish and the cecal contents of minor species and veal, we found that a majority (over 77%) of the *Salmonella* were not resistant to antimicrobials. As expected, in the NARMS expansion samples, less than 10% of *Salmonella* found were MDR. This study is ongoing, and we will conduct further AMR analyses for *Salmonella* as well as *Campylobacter*, *E. coli* and *Enterococcus* found in the samples we collect.

Antimicrobial resistance data from ceca provide a snapshot of the preslaughter exposure of the animals to factors that may trigger or spread AMR. FSIS ensures food safety and safeguards public health through its stringent oversight of inspection procedures related to animal slaughter and processing. This includes slaughter establishments' compliance with the sanitary dressing procedures. During sanitary dressing, the animal's digestive tract (including cecal contents) is removed entirely and antimicrobials may be applied to address incidental contamination on carcasses. There is a zero-tolerance standard for fecal contamination on carcasses. As a result, the AMR findings from cecal content samples do not reflect imminent and direct consumer exposure. Instead, the findings inform the NARMS surveillance about preslaughter changes in AMR trends, and the development and/or spread of novel AMR as seen via the cecal content bacteria. Details on the scope of FSIS NARMS testing and more analyses of our NARMS expansion work can be found on [FSIS's NARMS Webpage](#).

Uday Dessai, Gamola Fortenberry, Catherine Rockwell, Leslie Manis, Mustafa Simmons, Glenn Tillman, Spencer Pretectrum, Sheryl Shaw, USDA Food Safety and Inspection Service