

## I. Introduction

In an effort to prospectively monitor the emergence of antimicrobial resistance in zoonotic pathogens, the National Antimicrobial Resistance Monitoring System (NARMS) was established in 1996 by the Food and Drug Administration's Center for Veterinary Medicine in collaboration with the Centers for Disease Control and Prevention, and the United States Department of Agriculture (USDA).

The animal component of NARMS is housed within the Bacterial Epidemiology and Antimicrobial Resistance Research Unit (BEAR) of the USDA's Agricultural Research Service in Athens, Georgia. For this report, the animal component of NARMS comprises the testing of isolates obtained from food-producing animals at slaughter through the USDA Food Safety and Inspection Service (FSIS) Pathogen Reduction: Hazard Analysis and Critical Control Point (PR/HACCP) verification testing program.

The antimicrobial agents selected for study are representative of antimicrobials used in both human and veterinary medicine and are selected primarily based on therapeutic value although molecular mechanisms of resistance or treatment patterns may also influence selection. Non-Typhi *Salmonella* was chosen as a sentinel organism of the NARMS program. Testing of *Campylobacter* and *Escherichia coli* isolates from animals began in 1998 and 2000, respectively.

This report summarizes 2009 data for *Salmonella*, *Campylobacter*, and *E. coli* isolates from food-producing animals at slaughter (chicken, turkey, cattle, and swine). Resistance data for previous years is included; however, due to the amount of data and complexity of analyses involved, all permutations are not represented. Additional information on the animal component of NARMS including past annual reports, summary trend tables and graphs, as well as a component for interactive data analysis can be found on the [USDA's NARMS web page \(http://www.ars.usda.gov/saa/bear/narms\)](http://www.ars.usda.gov/saa/bear/narms). Other analyses are available upon request.

The [2008 NARMS Executive Report](#) contains additional background information on sampling and testing methodology for the human and retail arms of NARMS as well as summary data from all three components.

## II. Sampling and Testing Methods

### A. Samples

The *Salmonella* isolates included in this report were recovered by FSIS from carcass rinsates (chickens), carcass swabs (turkeys, cattle, and swine), and ground products (chickens, turkeys, and beef). *Campylobacter* and *E. coli* isolates included in this report were recovered by BEAR from FSIS Eastern Lab carcass rinsates (chickens).