

Ensuring a Safer Food Supply: The National Antimicrobial Resistance Monitoring System's Surveillance of New Mexico's Retail Meat

Given increasing concerns over bacterial antimicrobial resistance, the United States Food and Drug Administration (FDA) teamed with the Centers for Disease Control and Prevention (CDC) Emerging Infections Program (EIP) to collect data on the prevalence of antimicrobial resistance among foodborne bacteria. The New Mexico Emerging Infections Program (NM EIP) is an active, laboratory-based surveillance and research program within the Infectious Disease Epidemiology Bureau of the New Mexico Department of Health (NMDOH) Epidemiology and Response Division that conducts its work in partnership with the University of New Mexico (UNM) and collaborates with nine other states as part of the national EIP network. NM EIP has participated in the national EIP Retail Meat Study (RMS) since 2004. The RMS is a project initiated in 2002 by the National Antimicrobial Resistance Monitoring System (NARMS), in collaboration with the FDA's Center for Veterinary Medicine (FDA CVM) and the United States Department of Agriculture (USDA), to monitor the prevalence and antimicrobial drug resistance of *Salmonella*, *Campylobacter*, *Enterococcus*, and *Escherichia coli* (*E.coli*) in retail meat.¹ NARMS' primary objectives are to: 1) monitor antimicrobial resistance trends among foodborne bacteria from humans, retail meats, and animals, 2) disseminate timely information on antimicrobial resistance to promote interventions that reduce resistance among foodborne bacteria, 3) conduct research to better understand the emergence, persistence, and spread of antimicrobial resistance, and 4) assist the FDA in making decisions related to the approval of safe and effective antimicrobial drugs for animals.¹ New Mexico's contribution to NARMS RMS provides important information for public health purposes, both locally and nationally. This report describes NM EIP participation in NARMS RMS as well as select results from the surveillance of retail meat for antimicrobial resistance.

**Lisa Butler, MPH, Sarah Lathrop DVM PhD,
University of New Mexico;
Paul Torres, MS, Scientific Laboratory Division,
New Mexico Department of Health**

National Methods

NARMS RMS samples are collected from local grocery stores in the 10 EIP states (Connecticut, California, Colorado, Georgia, Maryland, Minnesota, New Mexico, New York, Oregon, Tennessee) plus Pennsylvania. All sites test four meat types (chicken breast, ground turkey, ground beef and pork chops) for *Salmonella*; chicken breast and ground turkey samples are also cultured for *Campylobacter*, both *C. jejuni* and *C. coli*. Meat sample bacterial isolates are sent to the FDA Center for Veterinary Medicine (CVM) for species and serotype confirmation and antimicrobial susceptibility testing. *Salmonella* and *Campylobacter* antimicrobial susceptibility testing includes eight antimicrobial classes including Quinolones, Tetracyclines, Penicillins, and Cephalosporins, plus multiple antimicrobial agents in each class. Genetic markers in positive *Salmonella* and *Campylobacter* isolates are identified using pulsed-field gel electrophoresis (PFGE). PFGE markers are submitted to the CDC PulseNet program, a national network for foodborne pathogen deoxyribonucleic acid (DNA) fingerprinting which expedites foodborne disease outbreak detection.¹

New Mexico Methods

Due to time and distance challenges presented by geography and location of population centers, NM EIP RMS sample shopping is limited to four counties: Bernalillo, Santa Fe, Valencia, and Sandoval, with an estimated total population of greater than one million persons. Each January, CDC NARMS provides a complete one-year shopping schedule and a monthly list of five randomly selected 'primary' and 'alternate' retail grocery stores. Two one-pound packages of chicken breast, ground turkey, ground beef, and pork chops are purchased. Should a primary store lack the required

two one-pound packages of any meat type, a store from the alternate list is selected. Precise protocols for storage, processing and testing are used at the NMDOH Scientific Laboratory Division (SLD).

Results 2008–2010

During 2008–2010, nationally, more than 7,000 meat samples each year were tested for *Campylobacter* and *Salmonella* contamination. NARMS reported that 22% of those poultry samples were contaminated with *Campylobacter* and 16% with *Salmonella*, compared to New Mexico results of 23% and 29%, respectively. NARMS chicken breast samples were most likely to contain *Campylobacter* (42%) contamination, and ground turkey and chicken breast were equally likely sources for *Salmonella* (16%) contamination. For the same years, 480 NM chicken breast and ground turkey samples were tested each year for *Campylobacter* and *Salmonella* contamination. NM average *Campylobacter* isolate results were similar to the NARMS averages for all three meat categories. NM, however, had higher rates of contamination for *Salmonella* for all three meat categories. NARMS reported 16% *Salmonella* contamination for each meat category compared to the NM results for combined chicken breast and ground turkey (29%), chicken breast (23%), and ground turkey (35%).¹ (Figures 1, 2).

Bacterial isolates from meat samples were tested for antimicrobial resistance. Antibiotic resistance patterns are reported at the national level. During 2008–2010, 1,593 (1,088 *C.jejuni* and 505 *C.coli*) positive *Campylobacter* isolates from chicken breasts were tested for antimicrobial resistance. During these years, an average of 16% of *Campylobacter* isolates (both *C. jejuni* and *C. coli*) from chicken breast samples were found to be multidrug resistant, meaning the isolates were resistant two or more antimicrobial classes.¹

No antimicrobial resistance was found, on average, among 37% of *Salmonella* isolated from chicken breasts between 2008 and 2010, or among 25% of isolates from ground turkey, 65% of *Salmonella* from ground beef, or 50% of isolates from pork chops. Resistance to three or more antimicrobial classes was most common in *Salmonella* isolates from chicken breast (43% average from 2008–2010), followed by isolates from pork chops (39%), ground turkey (37%) and ground beef (33%). In 2010, 19 *Salmonella* isolates from chicken breast (11% of 171 isolates tested)

were found to be resistant to six or more antimicrobial classes, as were 17 (8%) of isolates from ground turkey and two isolates (29%) from ground beef.¹

Discussion

RMS provides specific data on bacterial contamination of commonly purchased retail foods, as well as the antimicrobial resistance patterns identified in those isolates. Meat samples collected from NM grocery stores continue to show contamination with *Campylobacter* and *Salmonella* bacteria. During 2008–2010, chicken breasts were more likely to show contamination with *Campylobacter* and ground turkey was a more likely source of *Salmonella*. Often these bacterial isolates were resistant to two or more antimicrobial classes relied on by physicians to treat human bacterial infections.

Inappropriate and overuse of antimicrobial agents in food animals (cattle, swine, poultry) and in humans have been raised as important issues in the U.S. Data provided by RMS, systematically collected and analyzed, can help inform debates, policy decisions and antimicrobial stewardship activities related to those concerns. A more specific example of benefit to NM participation in RMS was demonstrated in 2011. From May to August 2011, a multistate cluster of *Salmonella* infections occurred, affecting almost 100 persons, with one death reported. One of two ground turkey isolates matching the outbreak serotype was purchased and identified through NM RMS. This local isolate identification contributed to the national epidemiological investigation to identify the source of contaminated ground turkey products, product distribution records, and manufacture processing plant. Approximately 36 million pounds of ground turkey products were subsequently recalled.²

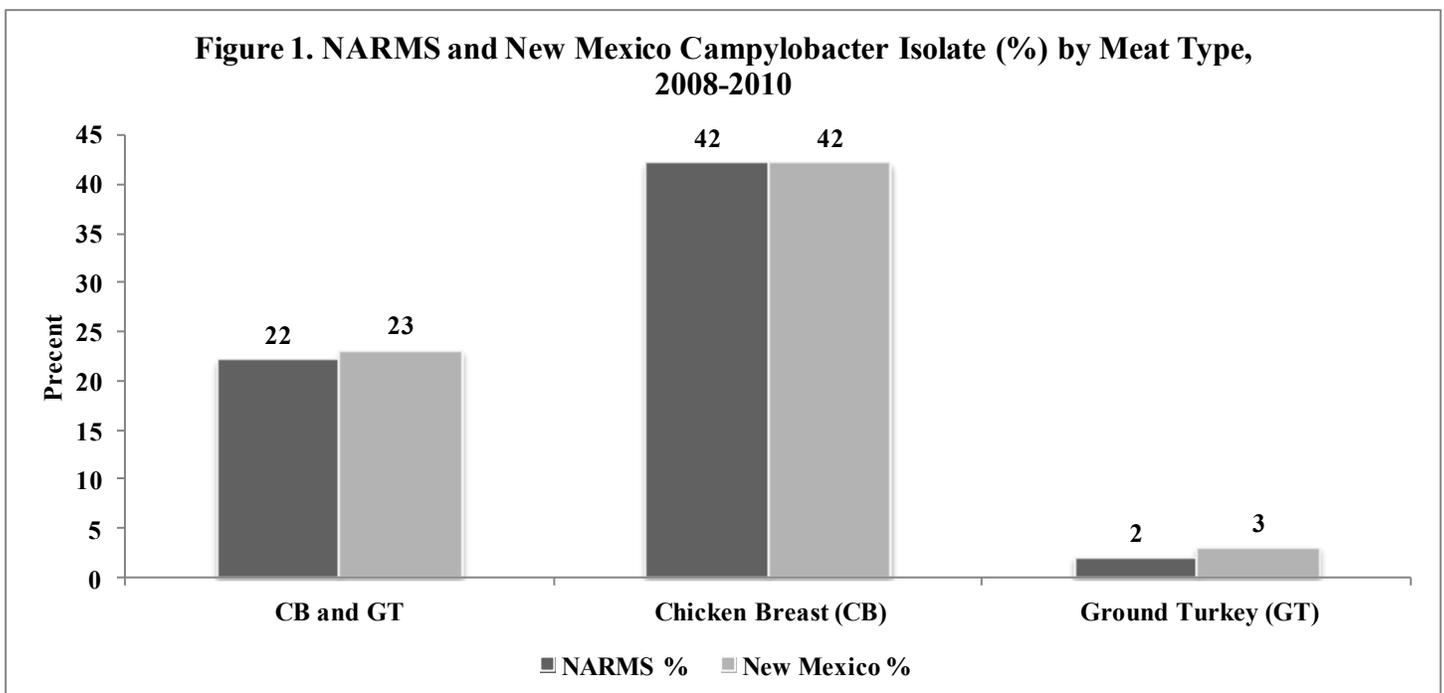
In light of the RMS-documented bacterial isolation from retail meat sources, consumers should be reminded of simple food-safety precautions, including thorough cooking at proper temperatures, washing hands after meat handling, and separation of raw meat from other foods to prevent cross-contamination. Public health messages in NM should continue to focus on these consumer food-safety precautions. In order to contribute to national surveillance of bacterial contamination of meat and pathogen-specific antimicrobial resistance patterns and provide stakeholders with ob

jective measures, New Mexico will continue to participate in the RMS.

NARMS 2010 specific meat sample testing methods, results, and antimicrobial breakpoints can be found at: <http://www.fda.gov/downloads/AnimalVeterinary/SafetyHealth/AntimicrobialResistance/NationalAntimicrobialResistanceMonitoringSystem/UCM293581.pdf>

References

1. FDA. National Antimicrobial Resistance Monitoring System Retail Meat Annual Report, 2010. Accessed April 13, 2012 from <http://www.fda.gov/downloads/AnimalVeterinary/SafetyHealth/AntimicrobialResistance/NationalAntimicrobialResistanceMonitoringSystem/UCM293581.pdf>
2. CDC. Timeline of Events: Multistate Outbreak of Salmonella Heidelberg Infections Linked to Ground Turkey - United States, 2011. Accessed May 14, 2012 from <http://www.cdc.gov/salmonella/heidelberg/091411/timeline.html>



The New Mexico Epidemiology Report

C. Mack Sewell, Dr.P.H., M.S.
State Epidemiologist

Michael G. Landen, M.D., M.P.H.
Deputy State Epidemiologist & Editor

The New Mexico Epidemiology Report
(ISSN No. 87504642) is published monthly
by the
Epidemiology and Response Division
New Mexico Department of Health
1190 St. Francis Dr.
P.O. Box 26110, Santa Fe, NM 87502

24-Hour Emergency Number:
(505) 827-0006
www.health.state.nm.us

Presorted
Standard
US Postage
PAID # 390
Santa Fe, NM

Figure 2. NARMS and New Mexico Salmonella Isolate (%) by Meat Type, 2008-2010

