# Clostridium difficile in Retail Meats

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[Karen Hunter] Hello. I'm Karen Hunter. In the studio with me today is Dr. L. Clifford McDonald, medical epidemiologist from the CDC's Division of Healthcare Quality Promotion. Today, we're talking about two papers in the May 2009 issue of CDC's journal, Emerging Infectious Diseases. The articles both describe studies that looked for the presence of the organism *Clostridium difficile* in meat for sale in grocery stores and markets in the United States and Canada. Welcome, Dr. McDonald.

[Cliff McDonald] Thanks, Karen. It's great to be here.

[Karen Hunter] Tell us a little bit about *Clostridium difficile*.

[Cliff McDonald] *Clostridium difficile*, or C. diff as it's often called, is a bacterium that is widely distributed in nature but is primarily a problem associated with people who receive antibiotics in hospitals or in nursing homes. In those settings, C. diff is often found to be resistant to a number of drugs that we typically use to fight infections caused by other bacteria (for example, pneumonia or a urinary tract infection). These drugs don't just treat infections but also disturb the normal bacteria of the lower intestine, allowing the bacteria not affected by the drug – in this case, C. diff – to flourish and produce toxins, which leads to diarrhea and an inflammation of the intestine called colitis. C. diff infections have been increasing in both number and severity in the United States. There are no firm numbers, but CDC estimates that there are several hundred thousand cases each year of C. diff infections in the United States which result in several thousand deaths. Most of these C. diff cases – about 80 percent – occur in hospitals, nursing homes and outpatient health facilities. There is a small proportion of cases that are not associated with healthcare, what we call community-associated cases, and these are a real concern as well.

[Karen Hunter] Some organisms are regularly found in people's intestines. Is that the case with C. diff? And if not, how do people get infected with C. diff and who is most at risk?

[Cliff McDonald] C. diff has occasionally been found in the intestines of healthy people, which is not surprising since it can be found widely in nature. Those most at risk for illness are the elderly and people with weakened immune systems in healthcare settings. Virtually everyone who develops C. diff infection in a hospital has received antibiotics for the treatment of some other infection; these drugs decrease the body's natural protection against C. diff. In hospitals and long-term care facilities, C. diff is spread between patients through contact with the bacterium found in the feces of infected patients. People can become infected if they touch items or surfaces that are contaminated with feces and then touch their mouth. Healthcare workers can also spread the bacteria to other patients or contaminate surfaces if they don't thoroughly wash their hands.

In the community, it's difficult to say what causes C. diff infections. Many people who get it haven't been recently hospitalized or even had antibiotics right before getting infected.

Investigations are on-going to try to determine possible ways they could have gotten the infection, such as from other people, visits to nursing homes, outpatient visits to healthcare facilities, contact with animals, or from food. At this point, we just don't know enough to say anything definitively about the sources of the infections in the community.

[Karen Hunter] The papers we're discussing today look at one of those possible avenues, specifically whether C. diff can be found in meat that's sold in grocery stores. Tell us about the papers and what the authors found.

[Cliff McDonald] The papers report on two very different studies that both looked at the presence of C. diff in meat products. The authors in the first study tested for the presence of C. diff in different types of meat collected from three grocery stores in Tucson, Arizona over a three-month period. They found that more than four out of 10 of the samples tested positive for C. diff. Ready-to-eat products were more commonly found to have C. diff in them. Pork braunschweiger and ground beef were the products that most commonly tested positive for C. diff.

The second study tested for the presence of C. diff in samples of ground beef and veal chops from across Canada collected as part the national food safety system over a longer period of time. This study was larger and showed that 6 percent of the samples tested positive for C. diff. The Canadian authors also looked at whether C. diff was more likely to be found at certain times of the year and discovered that it seemed more common in January and February.

[Karen Hunter] The two papers clearly show different levels of C. diff in these meat products. Now what could account for the difference and what do these findings mean?

[Cliff McDonald] Well, Karen, it's really not clear why one paper found a greater proportion of samples that tested positive. The studies were not done in exactly the same way. The researchers on these two papers used different laboratory methods to test for the presence of C. diff, which may have had an impact. It also may be related to smaller sample sizes, different geographic locations studied, or seasonality, as one of the papers suggests. The studies also looked at different kinds of meat. The Arizona study included testing various meat products, including ready-to-eat meats, in addition to beef products. The Canadian researchers focused only on ground beef and veal chops.

[Karen Hunter] Since both studies found at least some samples that had C. diff in them, should people be worried about eating meat?

[Cliff McDonald] Well, Karen, it's important for people to remember that C. diff is widely distributed in nature. There has not been a documented case to date of C. diff passing from food animals to humans. It's not known how much C. diff in food someone would have to eat to become sick, or whether only certain strains of C. diff would pose a risk, or if a person had to be in a high-risk category, or even whether there are any circumstances in which it would be possible to develop a food-borne C. diff infection. Because C. diff has been found in meat, the possibility does exist, but it likely would represent a very small portion of the cases of C. diff infection. At this point, we just don't know enough to say anything definitively.

[Karen Hunter] So how would C. diff get in the meat?

[Cliff McDonald] We've known for a long time that animals – both animals in the food supply chain and household pets – can carry C. diff. These studies really don't explain how it got into the meat. The authors speculate that some of the possible ways are: through C. diff spores depositing in animal tissues before the animal moves into the food chain, contamination of the meat from the environment or during processing, or possibly contamination – from either other meats or humans – while in the stores.

[Karen Hunter] It sounds like we know a lot about C. diff but we also have a lot to learn. What's the most important thing people should know?

[Cliff McDonald] I think the thing that's most important for people to know is that C. diff is found widely in nature and illness caused by this organism remains primarily a problem associated with people who receive antibiotics in hospitals or in nursing homes. On that front, CDC has been working with hospitals to determine which antibiotics are most commonly linked to outbreaks of C. diff infection. We're also examining whether improved cleaning measures could help control or prevent C. diff outbreaks. And finally, we work with hospitals to provide recommendations to help them protect their patients. These include promoting the use of antibiotics only when necessary, good hand washing with soap and water, especially during outbreaks, and taking special measures when treating patients who have C. diff to prevent passing the infection to others.

On the food side, the U.S. Department of Agriculture's Food Safety and Inspection Service is the lead government agency responsible for regulating the safety of meat. CDC has been working closely with the USDA to share information with them about C. diff in meats. We've also been exploring what other research needs to be done to better understand the rates of C. diff in food and also to learn more about what risk, if any, this poses to the public's health.

[Karen Hunter] Dr. McDonald, it sounds like there's some interesting work ahead. Thanks so much for joining us today.

We've been talking about two papers that appear in the May 2009 issue of CDC's journal, Emerging Infectious Diseases. You can see the full articles online at www.cdc.gov/eid.

For more information on food safety in the United States, please visit www.foodsafety.gov. If you'd like to comment on our podcast, please send an email to eideditor@cdc.gov. I'm Karen Hunter, for Emerging Infectious Diseases.

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