

## Why GAO Did This Study

Since 2006, the U.S. beef industry has recalled over 23 million pounds of beef owing to contamination from pathogenic strains of Shiga toxin-producing *Escherichia coli* (STEC) bacteria. These strains do not harm cattle but may contaminate meat during slaughter. If humans eat contaminated meat without properly cooking it, STEC can cause illnesses, including bloody diarrhea and Hemolytic Uremic Syndrome, which is characterized by kidney failure and can be fatal. The Departments of Health and Human Services (HHS) and of Agriculture (USDA) play a role in reducing STEC. USDA stated that interventions to reduce STEC before slaughter offer a significant opportunity to improve food safety.

GAO reviewed (1) interventions before slaughter that may help reduce STEC in cattle; (2) USDA's role in approving STEC vaccines; (3) the extent to which STEC strains have been determined to be adulterants in beef and the status of tests to detect them; and (4) practices, if any, other countries have employed that could reduce STEC in cattle and may be relevant to U.S. efforts. GAO reviewed documents; visited cattle feedlots and a slaughter plant; and interviewed agency officials, researchers, and industry and consumer group representatives with expertise in STEC in cattle.

## What GAO Recommends

GAO recommends, among other things, that USDA provide more specific public guidance on the license approval requirements of STEC vaccines. USDA neither agreed nor disagreed with this recommendation.

View [GAO-12-257](#) or key components. For more information, contact Lisa Shames at (202) 512-3841 or [shamesl@gao.gov](mailto:shamesl@gao.gov).

## FOOD SAFETY

### Preslaughter Interventions Could Reduce *E. coli* in Cattle

#### What GAO Found

U.S. Department of Agriculture (USDA) and university researchers identified several treatments administered before cattle are slaughtered, or preslaughter interventions, that could reduce Shiga toxin-producing *Escherichia coli* (STEC) in cattle. Such preslaughter interventions include bacteriophages (viruses that infect and kill bacteria), probiotics (live bacteria that can benefit the digestive system), vaccines (biological preparations that alter the immune system), and sodium chlorate (chemical that kills the STEC O157:H7 strain). However, few manufacturers have submitted applications for preslaughter intervention products to target STEC according to officials from USDA and the Food and Drug Administration. One exception is for vaccines to reduce STEC O157:H7.

For preslaughter interventions, USDA exercises responsibilities for licensing and regulating STEC vaccines. However, USDA's approval requirements for these vaccines are unclear, according to some industry representatives. Specifically, USDA's general guidance does not address some of the unique challenges faced by manufacturers of animal health products seeking STEC vaccine approval. For example, the guidance does not explain that, if studies conducted in the laboratory are insufficient to demonstrate efficacy, the manufacturer would also need to demonstrate that the vaccine is effective in a field setting such as a feedlot. In contrast, the Canadian Centre for Veterinary Biologics provides more specific guidance about when it requires the use of laboratory or field studies to demonstrate efficacy for vaccine license applications. Without guidance that gives manufacturers clear and more specific information they need to submit for an acceptable application, the approval process for STEC vaccines could face potential delays.

In addition to STEC O157:H7, which it stated in 1994 was an adulterant—a substance that renders food injurious to human health—in September 2011, USDA determined that six other STEC strains were adulterants in raw ground beef and beef trim (meat left after steaks and roasts are cut from beef). USDA has tests for these six strains and plans to use them in slaughter plants starting in June 2012. However, it may be difficult and time-consuming to confirm positive test results because certain test components are either not commercially available for all strains or do not always provide clear results. USDA is working to improve the tests and to find a commercial supplier for one key test component. Also, a few companies voluntarily test for these strains.

Some foreign governments have practices that could be relevant to U.S. efforts to reduce STEC in cattle such as the following:

- The European Parliament and the Council of the European Union require certain measures, such as verification of cleanliness by an inspector, to ensure that the cattle going to slaughter are clean. In contrast, USDA assesses the health of cattle but does not inspect for cleanliness.
- At least 12 European Union member countries collected and reported data on STEC in live cattle in 2009. USDA has conducted STEC testing in live cattle, but has not tested since 1999.
- When a person becomes ill from *E. coli* in Sweden, government officials try to determine the specific farm that sold the contaminated cattle so that other carcasses from the farm can be tested for STEC. USDA does not trace the STEC source back to the farm.