

THE beef industry has been taking a beating for years from people who believe consumption of red meat to be unhealthy. Those claims have been disputed, as medical science has shown the essential nutrients red meat provides and the important role low-fat beef plays in a healthy diet.

The latest challenge the industry must combat is not from vegetarians but from bacteria. It comes in the form of a pathogen which can cause serious and potentially fatal illness in humans.

E. coli or *Escherichia coli* are a group of bacteria normally found in the intestines of warm-blooded animals, including some food animals and humans, and in water contaminated by animal or human feces. The U.S. Department of Agriculture (USDA) estimates there may be up to 20,000 cases of *E. coli*-related food poisoning each year. Those with mild cases experience symptoms similar to stomach flu, including intestinal cramps, vomiting and diarrhea. However, about 10 percent of the cases can develop into serious health problems requiring hospitalization. About 1 percent of all cases are fatal. The economic cost to the United States is estimated to be between \$216 to \$580 million.

A particular worry is a specific strain of the *E. coli* family of bacteria called 0157:H7. Within a few days of being ingested, even small amounts of the bacteria can cause cramps, bloody diarrhea, and a condition called hemolytic uremic syndrome (HUS), which may result in kidney failure, brain damage, stroke and even death. Children are particularly vulnerable to HUS because their intestinal tracts are more permeable than adults, giving bugs better opportunities to invade the body.

In 1993 undercooked hamburger containing *E. coli* 0157:H7 caused four to die and hundreds to become ill in the state of Washington. Cases of illness and death attributed to eating a hamburger not only cause human suffering but advertise 'Don't eat beef' in ev-

GETTING THE BUGS OUT

WHAT IS *E. COLI* BACTERIA? WHAT'S BEING DONE TO COMBAT IT? AND WHAT CAN YOU, THE PRODUCER, DO TO HELP THE BEEF INDUSTRY PREVENT IT?

BY JULIE GRIMES ALBERTSON



Just as kids and hamburgers go hand in hand, so should food safety and beef production. Today's beef industry is relying on science as well as packer and producer cooperation to make further improvements.

ery headline or news segment. Here is one personal case, as reported by Richard Lahberte in the May 1995 issue of *Parents* magazine:

It was a Tuesday in February 1993 when Bonnie Rock treated her 5-year-old daughter Stephanie, to a

hamburger at a fast-food restaurant in West Palm Beach, Fla. where they live. Late Thursday Stephanie developed diarrhea, waking every hour or so. "Her temperature was never over 100," Bonnie says. "I couldn't put my finger on what was wrong."

On Friday, as Stephanie was sit-

ting down for tea and toast, she bent over in excruciating pain. Bonnie was horrified when she noticed a pool of blood under Stephanie. She was hospitalized immediately, but her condition worsened. Her urine turned a tea-cranberry color indicating kidney involvement, and her skin bruised at a touch. Finally she got to the point where she no longer seemed to recognize her mother. By this time, doctors suspected 0157:H7, and work began on clearing Stephanie of toxins with blood transfusions. Her condition gradually improved, and "by day 10, she finally asked for something to eat...pizza," Bonnie says.

It took three months for Stephanie to regain her strength, although, Bonnie says, "I don't know if she will ever be the same."

Children who have been through what Stephanie has are at increased risk of having kidney problems and needing transplants later in life.

"I can't tell you what its like to sit for five days at your child's bedside and have doctors not be able to look you in the eye and tell you whether she'll live or die, just because you fed her a hamburger," says Bonnie.

What's Being Done?

The meat industry has responded by developing a blueprint that can be used to help manage food safety risks associated with the pathogen. The blueprint, which includes recommendations for both industry and government actions, was developed by a special National Live Stock & Meat Board task force made up of scientists from industry and from state and federal government agencies.

The scientists emphasized the "need to adopt a comprehensive farm-to-table safety program based on science and risk analysis." The task force made several broad recommendations for control of *E. coli* 0157:H7:

- Implement Hazard Analysis and Critical Control Points (HACCP) systems in each segment of the food production chain. HACCP

is a system to identify and monitor critical control points in the production process. The industry has recommended that government meat inspection be based on HACCP systems in plants.

- Conduct research to gain a greater understanding of the source of *E. coli* 0157:H7. After determining how *E. coli* 0157:H7 enters the food chain, develop strategies to prevent and control it.
- Encourage government approval and industry-wide adoption of antimicrobial rinses for beef carcasses.
- Support government approval and encourage further research on irradiation as a means of eliminating any hazardous bacteria.
- Conduct research to develop new pathogen reduction/intervention technologies for use at every stage of the process from farm to retail or foodservice.
- Implement national consumer education programs of food safety. While the industry develops and uses new technologies, it must be recognized that meat and other foods will never be bacteria-free.

Producer Implications

H. Russell Cross, director of the Institute of Food Science and Engineering at Texas A&M University, points out that there's no silver bullet that will ensure our nation's food supply is 100 percent safe. However, producers can begin to employ HACCP on the farm and ranch by improving the sanitation of their premises and transport vehicles. Producers should monitor feeds to ensure the absence of chemical residues, and carefully follow all drug withdrawal times to prevent violative residues in livestock shipped to processing plants.

While no cattle producer is interested in having USDA inspectors checking the cleanliness of their livestock trailer, each segment of the industry needs to set high safety standards.

Ways to Protect Your Family from 0757:H7

Beware of rare — "Cook ground beef enough to get rid of all pinkness; cook unground cuts enough to thoroughly brown all but the center," says Susan Conley, USDA acting director of information and legislative affairs.

Keep everything clean — Avoid touching any food that has come in contact with raw meat. Wash hands and utensils and cutting boards used to prepare raw meat with soap and hot water. Periodically use bleach (2 teaspoons to 1 quart of water) to clean this kitchenware. Keep refrigerated meat on a plate to avoid dripping juice onto other foods, and don't serve cooked meat on the same platter that held it when raw.

Freeze and thaw intelligently — To keep bacteria from multiplying, freeze meats immediately after purchasing, or cook ground beef and poultry within days and other meats within three to four days. Always thaw in the refrigerator or in a microwave, then cook it immediately.

Plating it Safe is a highly recommended, fact-filled brochure on safe meat handling and cooking. Copies are available from your state Beef Industry Council.

For more information, contact: National Live Stock & Meat Board, 444 North Michigan Ave., Chicago, IL 60611; (312) 467-5520.



Gary Cowman, director of the Beef Quality Assurance program for the National Cattlemen's Association, receives calls all the time from producers who are confused by HACCP and other proposed policies.

"I try to show them the similarity between our Beef Quality Assurance Program

and HACCP. It really won't be much different from what they're already doing."

NCA leaders point out that further improvements in beef safety will depend on greater application of science to beef production and processing and to meat inspection.

"The industry has done an outstanding job of eliminating

What Is HACCP and How Does It Work?

Discussions of food safety and government meat inspection increasingly include mention of the term HACCP (pronounced hass-ip). Just what does this mean? The American Meat Institute Foundation, as part of a basic manual on HACCP provides this explanation:

HACCP offers a modern, scientific approach to safe food production. The initials stand for Hazard Analysis and Critical Control Points. The HACCP system has been recommended by the National Academy of Sciences and other groups for use throughout the food industry. The system also is recommended as a basis for federal food inspection.

HACCP is proactive and prevention-oriented. It focuses on preventing or controlling food safety hazards, including microbiological as well as chemical hazards. The system is most effective when used at each stage of food production, from farm to table. It can be and often now is used at the farm level, in slaughter and processing plants, in storage and distribution facilities, in retail and foodservice establishments, and in home kitchens.

Under a HACCP system, a "hazard analysis" is conducted to assess potential safety hazards. Then "critical control points" (CCPs) are identified throughout the production chain. At any CCP a loss of control could result in unacceptable safety risks.

Companies following HACCP programs maintain records to track and document monitoring efforts. These records can be checked by government to verify that the company is carefully controlling its processes and, as a result, attaining desired levels of safety.

the possibility of hazardous chemical residues," says W.R. Lloyd, a meat scientist and coordinator of NCA's Beef Quality Assurance Program. "The cattle industry's Beef Quality Assurance Program can be used — once research shows what can be done at the cattle production level — to help reduce *E. coli* problems. The incidence of *E. coli* 0157:H7 is very rare in cattle. At this point, the most rapid strides in assuring safety can be made in the packing and processing sector."

Lloyd believes new intervention strategies can help. One example is steam vacuuming carcasses prior to evisceration. In this method, processing plant workers apply steam to kill bacteria and to loosen contaminants, which are then vacuumed away. Other techniques include hot water washes and organic acid rinses.

Iowa State University, Ames, has formed a research partnership with the Electric Power Research Institute's Food & Agriculture division to use a state-of-the-art electron beam facility. This technology will be used to remove and destroy *E. coli* bacteria in meat products. It's hoped that positive results will lead to regulatory approval for widespread use of the research.

"Cattlemen are committed to producing a safe, wholesome food," says Bob Drake, NCA president and Angus breeder from Davis, Okla. "We have invested more than \$4 million on *E. coli* 0157:H7 research alone. We're urging that the best available science be approved by government and be used by industry to make further improvements."

While all the acronyms and blueprints may make the issue of food safety seem remote, its importance to beef producers can't be overemphasized. Not only should it be top priority to us as producers, but also as consumers. We shouldn't have to think twice about feeding our children or grandchildren a fast-food or backyard barbecue hamburger.

