

EPIDEMIOLOGY

JUICE-ASSOCIATED OUTBREAKS OF HUMAN ILLNESS IN THE UNITED STATES, 1995 THROUGH 2005

(J.D. Vojdani, L.R. Beuchat, and R.V. Tauxe)

Outbreaks of illness associated with consumption of fruit juice have been growing public health problem since the early 1990s. In response to epidemiologic investigations of outbreaks in which juice was implicated, the U.S. Food and Drug Administration implemented process control measures to regulate the production of fruit juice. The final juice regulation, which became effective in 2002, 2003, and 2004, depending on the size of the business, requires that juice operations comply with a hazard analysis critical control point (HACCP) plan. The Centers for Disease Control and Prevention (CDC) receives reports of food-associated outbreaks of illness. We reviewed fruit juice-associated outbreaks of illness reported to the CDC's Foodborne Outbreak Reporting System. From 1995 through 2005, 21 juice-associated outbreaks were reported to CDC; 10 implicated apple juice or cider, 8 were linked to orange juice, and 3 involved other types of fruit juice. These outbreaks caused 1,366 illnesses, with a median of 21 cases per outbreak (range, 2 to 398 cases). Among the 13 outbreaks of known etiology, 5 were caused by *Salmonella*, 5 by *Escherichia coli* O157:H7, 2 by *Cryptosporidium*, and one by Shiga toxin-producing *E. coli* O111 and *Cryptosporidium*. Fewer juice-associated outbreaks have been reported since the juice HACCP regulation was implemented. Juice operations that are exempt from processing requirements or do not comply with the regulation continue to be implicated in outbreaks of illness.

TOXOPLASMA IN SWINE AND CATTLE

(M.P. Torres, Y.R. Ortega, V.A. Cama, and J. Jones)

Toxoplasma can infect a wide range of warm blooded animals including humans. Infections generally occur by consuming cysts in raw or undercooked meats or by accidental ingestion of oocysts from cat feces/soil/water. Symptoms of human toxoplasmosis are generally mild but can be severe in the immunocompromised or in congenitally infected children. Consumption of undercooked pork and meat from sheep and game animals has been associated with human infections. The role of beef cattle, however, has not been fully elucidated.

We collected bovine and swine samples at slaughterhouses in the U.S. and Peru to determine the burden of *Toxoplasma* in meats produced for human consumption. Paired muscle and blood samples were collected from each animal. The presence of *Toxoplasma* was determined by PCR (b1 gene), serological testing using Western blot (WB), indirect hemagglutination (IHA), and tissue culture (TC).

Fifty bovine and 62 porcine samples from the U.S. and 200 bovine and 200 porcine samples from Peru were examined. Of the U.S. bovine samples examined, 14 (28%) were positive by WB, 6 (12%) by IHA, and 4 (8%) by PCR. Of the bovine samples from Peru, 40 (20%) were positive by WB, 9 (4.5%) by IHA, and 1 (0.5%) by PCR. Of the U.S. porcine samples examined, 11 (17.7%) were positive by WB, 7 (11.3%) by IHA, 10 (16.1%) by PCR, and 1 (1.6%) by TC. Of the porcine samples examined from Peru, 6 (3%) were positive by WB and 2 (1%) by agglutination. None of these samples were positive by PCR. Tissue culture attempts were successful in one U.S. porcine sample (1.6%). Serology suggests that cattle and swine are frequently exposed to, or infected with *Toxoplasma*, both in the U.S. and Peru. The isolation and culture of parasites from a U.S. porcine sample confirms its domestic foodborne potential. Overall, these findings emphasize the need for additional surveillance studies of meats for human consumption, and continuous programs to educate consumers as well as handlers of these products.