

E. Coli Again: A Troubling New Twist With Serious Consequences



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As we are writing this column, 2,153 people have become ill from an E. coli outbreak that is centered in Germany, 22 have died and approximately 30 percent of the reported patients have contracted hemolytic uremic syndrome (HUS). The species (serotype) of bacteria responsible for this outbreak is E. coli O104:H4 which is a non-104:H7 STEC (Shiga Toxin producing Escherichia coli).

This identification is important because, in the US, only E. coli O157:H7, which is responsible for about half of the E. coli-related illnesses, is considered an adulterant when found on meat. At this time, the "Big 6" non-0157 STEC, which are responsible for the other half of the E. coli related illnesses in the US are not considered to be an adulterant when found on meat and thus are allowed to be processed and sold to further processors and consumers.

The serotype found in the German outbreak is unique in several ways. First, the rate of HUS at 30 percent is much higher than found in other E. Coli serotypes where the number of people who contract HUS is between 5 and 10 percent.

Second, it is serotype O104:H4, a species that is not among the "Big 6" that the USDA is looking at in terms of rulemaking. Scientists are still studying this serotype. What is still unclear is whether it is a new mutation or whether it has been previously identified. It is clear that this is the first major outbreak attributed to O104:H4 and it is deadlier than most previous E. coli outbreaks. Every news report that we read seems to have additional information so we will want to wait for the dust to settle before describing its nature or origin in any detail.

As we think about public policy with regard to E. coli, there are a number of things that we need to understand. E. coli is an enteric bacteria, which means that it originates in the intestinal tract of a mammal. While it can survive for some period of time outside the bowel, the ultimate origin is always fecal matter.

In the past, E. coli related foodborne illnesses have been traced to direct fecal contamination of meat, poor hand washing practices of an infected person involved the processing, preparation, or serving of food, or the contamination of vegetables by contaminated irrigation water.

There are more than 700 serotypes of E. coli and only a few are responsible for illness in humans. In fact, the human gut is inhabited by non-toxic serotypes within 40 hours of birth. Some of these serotypes may have beneficial properties for human health.

The disease-causing serotypes contain genetic material that cause them to adhere to the walls of the human bowel and produce a Shiga toxin. The Shiga toxin creates clots in small blood vessels in the body thus causing damage. Because the kidneys contain a large number of small blood vessels, they are particularly susceptible to damage by a STEC.

There are very few treatments for STECs. In the US STECs are not treated with antibiotics because the antibiotic may also kill off beneficial bacteria and if the STEC is antibiotic resistant, it opens up more room for the STEC. News reports indicate that the protocol in this case in Europe is different and they are using antibiotics. Clearly, following this outbreak there will be a reevaluation of treatment protocols on both sides of the Atlantic.

While there is much to be settled with regard to the disease, one thing is very clear. It has been a disaster for farmers.

The outbreak was originally traced to cucumbers from Spain only to discover that while they had some E. coli contamination it was a different serotype. Meanwhile Spanish growers were dumping tons of product and the losses that are running \$286 million a week in revenue. In addition, a large number of workers have lost their jobs.

When it was determined that cucumbers were not the vector for the disease, other vegetables were suspected. The result was that the Russians who purchase some 40 percent of their fruits and vegetables from the European Union were talking about shutting down imports. There have also been reports that Europeans were cutting down on their use of raw fruits and vegetables, leaving farmers with perishable product that they are unable to market. The financial consequences will be felt by these farmers for quite a while.

This disease outbreak makes it clear that foodborne illnesses can come from previously unsuspected serotypes and the consequences may be more severe than with previous outbreaks.

The public takes foodborne illnesses seriously and their reaction can have severe monetary consequences for farmers who have no connection to the outbreak. While producers may chafe at regulations aimed at curbing the contamination of farm products with disease-causing pathogens, all it takes in a slip by one producer to create serious economic problems for all. △

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