



### **1. Further 0157 problems associated with Romaine lettuce**

A second outbreak reported this year of *E. coli* 0157 H7 has been linked to the consumption of Romaine lettuce in the United States and Canada.

32 illnesses have been reported during October from 11 states, including 13 people who have been hospitalised. One person developed hemolytic uremic syndrome, but deaths have also been reported. This latest outbreak is not thought to be related to the multi-state outbreak of *E. coli* O157: H7 infections linked to Romaine lettuce which occurred earlier this year. Epidemiological evidence for the earlier outbreak suggested that the contaminated Romaine lettuce originated from the Yuma region in Arizona. The Centre for Disease Control said the new investigation is ongoing and consumer guidance will be updated as more information becomes available. However, they are advising that consumers do not eat any Romaine lettuce until the source of the outbreak has been identified.

This is the sixth outbreak in the US and Canada which has been attributed to the consumption of Romaine lettuce over the last two years. To date, the outbreaks have resulted in 339 illnesses, 159 hospitalisations, caused kidney failure in 31 patients and resulted in 7 fatalities.

Last week in the UK, the Food Standards Agency published its latest guidance document on how to avoid cross contamination risks from *E. coli* 0157. The document was aimed at food business operators and local authorities and can be accessed via the following link [https://www.food.gov.uk/sites/default/files/media/document/e.coli-o157-control-of-cross-contamination-guide-nov-18-consultation\\_0.pdf](https://www.food.gov.uk/sites/default/files/media/document/e.coli-o157-control-of-cross-contamination-guide-nov-18-consultation_0.pdf)

### **2. Levels of AMR *E. coli* in UK retail meat remain low**

The Food Standards Agency have published the latest results of a three year study into levels of Anti-Microbial Resistant (AMR) strains of *E. coli* found on retail beef and pork in the UK. Year 3 of the survey was carried out between January and December 2017 during which 314 beef and 310 pork samples were purchased from retail premises in England, Scotland, Wales and Northern Ireland and tested for specific types of AMR *E. coli*.



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The results showed that less than 1% of the samples were positive for ESBL or AmpC E. coli, which are specific types of AMR. These results are similar to what was found in Year 1 of the survey. However, one beef sample was found to be contaminated with an E. coli containing the mcr-1 gene which confers resistance to the antibiotic colistin, which is thought to be the first time that a mcr-1 gene has been found on retail beef in the UK. The mcr-1 gene is found on a piece of DNA called a plasmid. Plasmids are naturally able to pass from one bacterial cell to another, even if they are of different species. This enables AMR to spread more easily. The mcr-1 gene can also make bacteria resistant to colistin. Colistin is an antibiotic from the 50's which fell out of favour due to its side-effects. However, it remains one of the antibiotics of last resort for people with multi-resistant infections caused by certain species of bacteria. Meanwhile, newly published research has suggested that lowering mutation rates in harmful bacteria might be an as yet untried way to hinder the emergence of antimicrobial pathogens. One target for drug development might be a protein factor, DNA translocase Mfd that enables bacteria to evolve rapidly by promoting mutations in many different bacterial species. This action speeds antibiotic resistance, including multi-drug resistance. The researchers from the University of Washington claim that development of drugs to block Mfd (therefore slowing the rate of potential mutations) could be a revolutionary strategy to address the worldwide crisis of treatment-resistant infectious diseases.

### 3. Salmonella linked to Polish eggs - Update

Almost 1,500 people have been made ill by Salmonella linked to Polish eggs in an outbreak that has lasted more than six years and affected 18 countries. In total, 1,412 cases are associated with the outbreak: 532 confirmed and 166 probable infections since Feb. 2017 and 343 historical-confirmed and 367 historical-probable cases between 2012 and Jan. 2017. More than 600 Salmonella enteritidis cases have been recorded by the United Kingdom, almost 300 from the Netherlands and nearly 200 by Belgium.

The European Centre for Disease Prevention and Control (ECDC) said most cases were reported during the summer months and therefore due to reporting delays, additional infections are expected over the coming months. Since an ECDC-EFSA outbreak assessment in Dec. 2017, 15 EU countries have reported 336 confirmed, 94 probable and three new historical-confirmed cases associated with the ongoing multi-country outbreak.

Historically, outbreak-confirmed cases were found to belong to four different whole genome sequencing (WGS) clusters, and investigations identified eggs from Poland as the vehicle of infections and control measures were implemented. However, new outbreak cases were notified in 2017 and in 2018 with similar magnitude and temporal patterns. As part of the investigations, Polish eggs were implicated as the cause of the outbreak and the source was traced back to three egg packing centres and 52 laying hen farms.

### 4. Clostridium perfringens the cause of a church charity event outbreak

There was a good example of how Clostridium perfringens can cause problems when food is prepared in large quantities in a recent report on an outbreak caused by a charitable diner served by a church in North Carolina earlier this month. The church served a "Brunswick Stew" at a large barbeque event which was reportedly consumed by over 1,000 people.

Cooking such food in bulk requires the product to be portioned and chilled as quickly as possible following the cooking otherwise spore forming bacteria such as Clostridium perfringens which survive the cooking process can grow rapidly in the time it takes for the large volume of product to cool down. Also the large cooking vessels required to cook food in these quantities can provide perfect anaerobic conditions for these bacteria to proliferate.

Two thirds of the 468 people who ate the food at the event who have so far been contacted by health officials have reported suffering symptoms of food poisoning.



#### **5. Potential treatment for neurotoxic effects of botulism**

A compound that strongly inhibits botulinum neurotoxin has been identified by researchers at the USA Botulinum Research Centre and is described in an article published in the journal Applied and Environmental Microbiology. The researchers claim that the compound called nitrophenyl psoralen (NPP), could be used as a treatment to reduce paralysis induced by botulism.

Having initially identified the enzyme in botulinum neurotoxin that damages neurons, causing paralysis, they then screened a library of more than 300 natural compounds for enzymes that could neutralize the neuron-damaging activity. They identified one of the compounds, nitrophenyl psoralen, as having particularly strong activity against the neuron-damaging enzyme. There is currently no FDA-approved antidote for botulinum neurotoxin but Psoralen derived drugs are approved by the U.S. Food and Drug Administration, which would likely hasten the drug approval process for NPP, according to the scientists.

The article stated that although fewer than 200 botulism cases are reported worldwide each year, they cost more to treat than all the Salmonella outbreaks that occur, making botulism the most expensive form of food poisoning. Four infants in Texas recently developed botulism poisoning after being given pacifiers or dummies containing or dipped in honey. The children, all less than a year old, had to be admitted to hospitals for life-saving treatment.

#### **6. Possible reasons for the higher 0157 levels in Scotland identified**

Food Standards Scotland and the Food Standards Agency have published the report of a four year research project which provides important new evidence on E. coli O157.

The research, undertaken by a consortium of scientists led by the Roslin Institute, the Moredun Research Institute and Scotland's Rural College shows that the overall prevalence of E. coli O157 in cattle is similar across Great Britain, and has remained relatively consistent in Scotland over the last decade.

However, cattle in Scotland were found to have a higher level of a certain subtype of E. coli O157 – PT21/28 – which is associated with super-shedding in cattle (the passing of large volumes of the bacteria in faeces). As this subtype is also known to cause more severe human infection, it may be that the local exposure to this particular subtype is a potential factor for the rates of human E. coli O157 infection in Scotland being around three times higher than in England and Wales.

The research also trialled a vaccine, developed to limit E. coli O157 excretion from and transmission between cattle. Results indicated that the vaccine may be effective in reducing human exposure and infection from E. coli O157. Food Standards Scotland's Head of Food Protection Science and Surveillance, Dr Jacqui McElhiney, said: "This latest report is the culmination of a successful international collaboration, which has produced exciting new findings that will make a valuable contribution to our work in reducing the risks of E. coli O157. Scotland has historically had the highest levels of E. coli O157 infection in the UK and despite our best efforts, the number of people affected has remained stubbornly stable. This research has shed some light on the possible reasons for this and it is really encouraging to see the progress that has been made in developing a potential vaccine for controlling it."