

UNPASTEURIZED JUICES STRIKE AGAIN (AND AGAIN)

“Within the past week, eight confirmed and one probable case of Escherichia coli O157:H7 infections have been reported to the Washington State Health Department. Three of the cases have hemolytic uremic syndrome (HUS). So far, five cases are from King County. Two confirmed and one probable case is from Snohomish County [Everett area], and one case is from Thurston County [Olympia area]. Further information is being obtained at this time. If you are aware of any O157 infections in Washington residents or with a Washington exposure, please report them immediately to the Communicable Disease Epidemiology Section....”

On October 25, the above e-mail message was flashed to public health agencies in Washington, Oregon, and British Columbia. The message, typical of traffic on the formal and informal networks that link public health agencies around the country and the world, prompted Health Division epidemiologists to review Oregon’s most recently reported cases. Within a few minutes, we were able to verify that none of the cases reported in late September or October had reported any Washington connection. Furthermore, the number of Oregon cases was low and there was no indication of clustering by demographic characteristics, time, or location. This information was readily available because—in Oregon—physician reports of *E. coli* O157:H7 (“O157”) infections are soon followed up by local health department nurses, who interview patients or their surrogates. The questions cover possible exposures during the 1-7 days before onset of symptoms, including travel history. (Most O157 incubations fall into that range.)

Meanwhile, in Washington, the figurative bodies continued to pile up. The distribution of cases in multiple counties (none with significant travel histories) pointed the finger at a widely distributed product rather than a single exposure at a restaurant or other gathering. Nothing

came of rounding up the usual suspects (ground beef, raw milk), and other possibilities were considered. An extensive, open-ended questionnaire was used to interview cases, and it was noted that many of the cases recalled drinking Odwalla brand apple juice; others recalled drinking unpasteurized juice of unspecified brand. Odwalla markets a premium line of apple and other fruit juices—most of which were unpasteurized. A rapidly executed case-control study confirmed that consumption of Odwalla juice was very strongly associated with having been recently reported as a case. An identical restriction fragment length polymorphism (RFLP)¹ pattern was seen in patient isolates tested—consistent with a common source.

The announcement by Seattle-King County and Washington State epidemiologists led to the identification of Odwalla-associated cases in several other locations (California, Colorado, and British Columbia) where the brand was distributed. As of November 26, 67 confirmed cases have been linked to juice consumption, including 12 who developed hemolytic uremic syndrome. One child died. Symptom onsets range between October 13 and November 8. No Odwalla-associated cases have been identified to date in Oregon, apparently because by chance only a tiny fraction of the contaminated lots was distributed here.

WHAT, NO CULTURE?

At the time of the first public announcement on October 30, O157 had not been cultured from any Odwalla juice containers. It’s time to put a stake in the heart of the myth that if X, Y, or Z was the source of foodborne disease, then you should be able to recover the pathogen from the implicated food. This is utter nonsense. Indeed, far from being a *sine qua non*, such isolations are rarely accomplished and often not even attempted. Why is that? For one thing, implicated foods are often unavailable—most often because they have already been eaten! Consider O157 outbreaks, for example. When you add an incubation period of up to a week (or more) to a delay of 1-5 days before patients

seek medical attention, plus a lag before a fecal specimen is collected, plus the time to do and report the culture, plus a delay before cases are reported, plus the time it takes local health departments to track down and interview cases, plus the time it takes to put together multiple cases into a possible common-source outbreak..., it’s not so surprising that “leftovers” often don’t exist. Surprisingly, most persons don’t save aliquots of all the food they eat for subsequent microbiological testing. The lettuce or raw milk or apple juice sold at the same store or restaurant a month after the fact is not a very good surrogate. Moreover, all food is not uniformly contaminated, and tracking information, such as production lot numbers, is often unavailable, meaningless, or unlinkable to distribution data. Furthermore, while there are very sensitive methods for the detection of some microorganisms, these methods are not necessarily as sensitive as the “human bioassay” for pathogens (such as O157) that have a very low infectious dose. Also, the pathogens that were present on Monday can be overgrown by competing flora or otherwise killed by Friday, depending on how foods are handled. If you need more reasons, consider that testing a number of possible food sources for one or more specific agents using state-of-the-art methods is usually infeasible: too expensive, too labor-intensive, or not readily available.

Notwithstanding that tirade, culture results can be an important adjunct to epidemiological data if the latter are not conclusive (not an issue in the Odwalla outbreak). If nothing else, positive lab findings make it easier to convince the unfortunate few who don’t regularly read the *CD Summary*. In any event, O157 with a matching RFLP fingerprint was subsequently cultured from an unopened carton of Odwall apple juice, just as O157 was eventually cultured from frozen hamburger patties seized at Jack-in-the-Box restaurants in 1993, and just as *Salmonella* Newport was cultured from alfalfa spouts implicated in a large outbreak earlier this year in Oregon and British Columbia (*CD*

Summary 1996;45[4]).

In each of these outbreaks (and many others), the public was informed and corrective action taken long before any pathogens were cultured from the epidemiologically implicated food. "Pure" epidemiological data can be extremely compelling when coupled with biological plausibility, and these data must be released when public health action can prevent additional cases. In the Jack-in-the-Box outbreak, for example, over 250,000 hamburger patties from the implicated lot were recalled, preventing hundreds if not thousands of additional cases.²

HOW COULD THIS HAPPEN?

While some consumers were surprised that something like fruit juice could be contaminated with deadly pathogens, this is déjà-vu all over again. A 1982 Oregon outbreak traced to undercooked hamburgers³ is considered the first recognized cluster of O157 infections, but two years earlier Canadian physicians investigated a cluster of illnesses that in hindsight sound like textbook examples of severe O157 infections. Fourteen Ontario children developed HUS within a 10-day period following a prodrome of diarrhea—typically bloody—and abdominal cramps; one died.⁴ Three to six days before onset of symptoms, all had drunk unpasteurized apple cider from a local farm. No pathogens were identified from routine stool cultures, and other cases with milder presentation were not appreciated. (In the Jack-in-the-Box outbreak, only 9% of the reported cases developed HUS,² suggesting that the Canadian outbreak probably affected hundreds of people.) The best studied cider-associated O157 outbreak to

date occurred in 1992 in Massachusetts. The implicated cider was made from unwashed apples that had fallen onto the ground ("drops")—a common practice in the industry.⁵ Another cluster was reported in Connecticut just a few weeks before the Odwalla outbreak, traced to a small cider mill that used drops (albeit washed ones). The Odwalla outbreak is still under very active investigation, and no conclusions about the source of contamination have been announced. Preliminary findings suggest that only one series of production lots from a single day caused this outbreak.

The Massachusetts outbreak led to the discovery that O157 is tolerant of acidic conditions that might readily kill other enteric bacteria.⁵ (Fresh cider can have a pH <4.) Unpasteurized juices have also caused outbreaks of cryptosporidiosis,⁶ salmonellosis, and other infections. The bottom line is that fecal contamination of fruit and produce is common. Washing, surface disinfection, and general quality control is all helpful, but without heat treatment it is difficult if not impossible to guarantee the microbiological safety of foods. It remains to be seen if safety can achieve the same marketing cachet for food that it has for automobiles.

REFERENCES

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Bulletins from the Flu Front

ON NOVEMBER 26, Oregon's first influenza isolates (both type A) of the 1996-97 season were confirmed at the public health laboratory. The two lucky winners were residents of Klamath Falls and McMinnville, with symptom onsets on November 17 and 18, respectively. Sporadic skirmishes have been reported from at least 25 other states, including Washington and California. Of the first 75 isolates tested nationally, 71 (95%) were type A and 4 (5%) were type B. The incidence of influenza is likely to increase sharply in coming weeks. Most infections historically occur between January and March in Oregon, so it is not too late. Those who have dawdled can still contact and immunize their susceptible patients and thereby prevent many illnesses and deaths.

Clarification: Chlamydial Rx

A RECENT *CD SUMMARY* (October 15) noted that neither doxycycline nor azithromycin is recommended for use during pregnancy. While strictly speaking this is true, many providers, recognizing the advantages of a one-time regimen, are using azithromycin with apparent success to treat chlamydial infections in pregnant clients. We did not intend to imply an equivalent degree of concern about the two drugs. Azithromycin is a schedule "B" drug (as is erythromycin) for which safety and efficacy among pregnant or lactating women have not been formally established. Doxy, on the other hand, is a schedule "D" drug.