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January 21, 2011

Vol. 31, No. 02

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HOW YOUR COMMUNICABLE DISEASE REPORTING AND DIAGNOSTIC TESTING ASSISTED IN OUTBREAK DETECTION - Five Interesting Local Case Studies

Introduction

One of the most frequently asked questions we are asked by medical residents is "What do you do with the case(s) reported by a physician?" When local microbiologists are asked to forward selected isolates to the Nevada State Public Health Laboratory (NSPHL) for further testing, they often ask "What do they do with the isolates?". The following are some brief answers to these questions.

- ◆ We verify the diagnosis and treatment with the healthcare providers and obtain information on the severity of the case(s) if needed.
- ◆ We interview reported case(s) to find the exposures and risk factors and identify close contacts of the case.
- ◆ We evaluate exposures, try to identify the source(s) of infection, and implement control measures.
- ◆ We provide education regarding prevention and control measures to cases and contacts to prevent further spread of the communicable disease.
- ◆ We contribute to the body of knowledge on communicable diseases by reporting cases to the Centers for Disease Control and Prevention (CDC).
- ◆ NSPHL performs additional laboratory tests not generally performed at clinical or private labs. An example is DNA fingerprinting for *Salmonella*, *Shigella*, *Listeria*, and Shiga toxin-producing *Escherichia Coli* (STEC) including *E. coli* O157:H7. The purpose of performing such a test is to improve the capacity of foodborne outbreak detection by sharing data with other labs in the nation including the labs operated by the Food and Drug Administration (FDA) and the U.S. Department of Agriculture (USDA).

Thus, your reports are not only required by Nevada law but also, and most importantly, are the first critical steps to initiating the disease investigation therefore meeting the ultimate goal of controlling the spread of communicable diseases in the community.

However, in this article, we will address another important aspect of disease reporting: outbreak detection. In the following section, five real outbreaks are used to demonstrate how your individual reporting and ordering of appropriate diagnostic laboratory tests contributed to foodborne or waterborne outbreak detections between 2006 and 2010 in Washoe County. Outbreaks identified and reported by healthcare providers are not included in this article.

Case Studies

Case #1 – Botulism Outbreak & Chicken Broth, 2006

One case of botulism constitutes an outbreak. On Friday, December 29, 2006, a local Infectious Disease specialist notified us of two probable cases of foodborne botulism from one household. Of note, it is not unusual for outbreaks to be reported after normal business hours, on weekends, or on holidays. Upon receipt of the report, Washoe County Health District (WCHD) staff members promptly coordinated with state and federal staff to obtain *botulinum* antitoxin for treatment of the two cases, pending laboratory confirmation. In the mean time, several WCHD staff members spent their holiday in the hospital and/or at the cases' residence to conduct extensive epidemiological and environmental investigations. Garbage from the household was thoroughly examined by WCHD environmentalists. Numerous left-over food samples from the residence and an opened can of chicken broth (found in the garbage at the residence) with approximately 1 milliliter of leftover broth were collected and tested. Subsequently both cases were laboratory confirmed with *Clostridium botulinum* toxin type A infection. At the close of the investigation it was concluded that the chicken broth was the most likely cause of disease in the two cases. In this outbreak, timeliness of disease reporting played a critical role in the early treatment and investigation. Timely investigation and staff's quick response prevented any other members of the cases' household from eating the contaminated leftovers.

Case #2 – Salmonella Enteritidis Outbreak & Sick/Asymptomatic Food Handlers, 2007

During the period August 10 through August 15, 2007, two (2) laboratory reports of *Salmonella Enteritidis* were received by the Communicable Disease (CD) Program of the WCHD. Routine investigation revealed that two non-related cases had eaten at the same local restaurant prior to their illness, which kicked off subsequent intensive environmental and epidemiological investigations. A case-control epidemiological study did not reveal any common food items as the vehicle of disease transmission. Testing of employees of the implicated restaurant as part of the environmental investigation found that of the 29 employees tested, five were positive for *Salmonella Enteritidis*. Out of these five, only two reported having diarrhea, one denied any symptoms, one reported headache only, and one

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reported abdominal cramps only. Due to observed deficiencies in sanitizing and hand washing as well as the multiple positive employees, this restaurant's permit was suspended and the facility was closed for five days. There were 21 cases associated with this outbreak. Of 21, 14 were lab-confirmed and seven (7) were probable cases. Five (5) of 14 confirmed cases were restaurant employees and one (1) of 14 was the household contact of a restaurant employee. The remaining confirmed and probable cases were patrons of the restaurant. The investigation concluded that *S. Enteritidis* was transmitted through food handled by an infected worker or workers. Just imagine what would have happened if the health care providers did not order stool cultures for these ill persons or if the health care providers or testing laboratories did not report these cases! As a reminder for health care providers, please **do not** rely upon the laboratory's reporting only. As a healthcare provider, you are obligated to report all confirmed, probable, or suspect communicable diseases. We do not mind receiving duplicate reporting! In fact, the system is set up for redundancy in reporting to ensure that cases are not missed.

Case #3 – Campylobacteriosis Outbreak & an Illegal Cheese Vendor, 2008

As a result of appropriate ordering of tests by health care providers for *campylobacter* for patients with diarrhea illness and positive cases being reported to the WCHD, on March 17, 2008, an increase in confirmed *Campylobacter jejuni* cases was identified. Through routine investigation, the CD staff noticed that several cases had consumed unpasteurized, Mexican style, white cheese. Further investigation revealed the cheese came from an unpermitted ranch in a rural county in Nevada. WCHD conducted joint epidemiological and environmental investigations with the Nevada State Health Division and the Nevada Department of Agriculture. The investigation found that 23 cases in northern Nevada were likely associated with this illegal cheese vendor. A cease and desist order was issued by the State to prevent further manufacturing and distribution. All untested cheese and cream products were voluntarily discarded. Continued monitoring of the ranch revealed evidence the rancher had sold his cattle and moved away from the area.

Case #4 - Salmonella Rissen (S. Rissen) Outbreak & Ground White Pepper, 2009

This outbreak truly demonstrated the value of forwarding certain isolates to NSPHL by local microbiologists. On Monday morning, March 2, 2009, NSPHL reported three *S. Rissen* isolates identified from three northern Nevada residents, which was extremely unusual. NSPHL immediately posted this finding to PulseNet, a network run by CDC which brings together public health and food regulatory agency laboratories around the US. *S. Rissen* is an extremely rare serotype among approximately 2500 *Salmonella* serotypes. No *S. Rissen* outbreaks had previously been reported in the US. In Washoe County, no *S. Rissen* cases had been reported prior to 2009.

Soon after this posting, public health staff from the states of California and Oregon contacted WCHD and reported a total of 13 *S. Rissen* cases. In subsequent months, multiple West coast states including California, Oregon, Nevada, Washington, and Idaho worked diligently together and the "culprit" was quickly identified by March 25, the 23rd day after the outbreak was officially identified. The "culprit" was ground white pepper manufactured and distributed by a company located in northern California. The spice products sold by this company were then voluntarily recalled. At the time of closing this investigation on June 4, 2009, there were 87 cases from five states; 10 of them were Nevada residents. The challenges regarding clinical perspectives for this outbreak were: 1) ambiguous onset dates for some cases; 2) no typical gastrointestinal symptoms for some cases; 3) nearly 40% of isolates were identified from urine specimens, not stool specimens. Local environmental investigation revealed that the recalled products from this company were widely used by local food establishments, which was unexpected. Of 303 facilities contacted in Washoe County, 82 (27%) carried recalled products. All outbreak-related cases in Washoe County had exposure to the recalled products before the official recall. Again, this outbreak investigation would not have been successful if it were not for healthcare providers on the front lines ordering appropriate laboratory tests and microbiologists diligently working with NSPHL. Because we identified the source quickly and were able to control and stop the outbreak before it expanded, this outbreak did not receive national media attention like other recent Salmonellosis outbreaks associated with peanut butter or shell eggs.

Case #5 – Giardiasis Outbreak & a Local Golf Course, 2010

On Friday, August 13, 2010, an outbreak of giardiasis associated with a local golf course was identified through a traditional CD investigation. Subsequent epidemiological and environmental investigations found that 19 laboratory confirmed cases were associated with this outbreak. Onset dates were between July 11 and August 28, 2010 with a peak of onset dates between July 25 and 31. Although a definitive source of infection could not be determined, the investigation indicated the most likely source was non-potable water from surrounding ditches used to irrigate the golf course. Appropriate control measures were implemented and no further cases associated with the golf course were identified.

Should you have any questions on this article, please contact the CD Program at 775-328-2447. To report a communicable disease, please use one of following methods:

- ◆ Confidential fax to 775-328-3764 using a [Confidential Case Report \(CCR\) form](#)
- ◆ Confidential call to **775-328-2447**

