

Emerging Infections Newsletter for Clinicians

July 19, 2023

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Topics

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Foodborne Pathogens

- [MMWR](#) June 30, published data from FoodNet (the CDC active surveillance system). Enteric pathogens identified in 2022 by either culture or culture-independent diagnostic- tests (CIDT) were compared to the annual average incidence from 2016-18.
 - Although infection rates for *Salmonella*, *Shigella* and *Listeria* were stable, domestically acquired *Campylobacter* infections increased in 2022.
 - Poultry meat remains the most frequently identified source of *Campylobacter* infections (also true for *Salmonella*). It has also been [reported](#) due to unpasteurized dairy products, contaminated produce and contact with infected cat or dog feces.
 - Utilization of CIDT as the initial diagnostic modality has continued to increase. From 2016-18 the average was 49%, whereas it was 73% in 2022.
 - Although CIDT has significantly improved the turn-around-time for results with greatly improved sensitivity for *Yersinia*, *Vibrio*, and Shiga toxin-producing *E. coli* (STEC), CIDT does not allow any sensitivity testing or genomic sequencing to identify outbreaks.
 - Most notable in this report was the failure to demonstrate any reduction in foodborne pathogens in 2022 compared to 2016-18.
- Guillain-Barre' Syndrome (GBS) is an immune-mediated, neurologic disorder that results in inflammatory demyelinating and/or axonal neuropathy and is frequently triggered by infections (rarely immunizations). *Campylobacter jejuni* is the most frequently identified triggering infection although multiple different viruses have been reported as the preceding event. About [90%](#) of human *Campylobacter* illness is caused by *C. jejuni*.

- Zika was implicated as a preceding infection for the development of GBS during the 2016 outbreak. This was reported initially during the French Polynesia outbreak but subsequently mostly in South America. A multi-country Latin America case series demonstrating a close association between these two diseases was published in the [NEJM](#) in 2016. Post-Zika GBS remains rare.
- July 10, the Pan-American Health Organization ([PAHO](#)) reported an increase in cases of GBS in different regions of Peru in 2023.
 - In the first 27 weeks of 2023 (through July 8), Peru has received reports of 191 cases of GBS that meet the country's established definition. Almost 50% (96 cases) have been reported in the five weeks between June 5 and July 9.
 - This compares to 20 cases during that five-week time interval in 2021 and 2022.
 - Eleven cases have already had positive results for *Campylobacter jejuni*.
- In 2019, Peru reported an unprecedented outbreak of more than 1100 cases of GBS in several regions of the country.
 - A very thorough case-control study published in [Neurology](#) in 2021 showed that 65% of the 49 studied patients had evidence of a recent *C. jejuni* infection with closely related strains.
 - This included serologic and molecular testing, cultures and genomic sequencing of cultured isolates.
 - Arbovirus tests (Zika, Dengue, and Chikungunya) were negative. Genomic analysis of the 4 positive culture isolates revealed a lipooligosaccharide (LOS) biosynthesis gene locus that has previously been identified as capable of producing LOS that mimic human gangliosides.
 - This strain has previously been shown to be widely circulating in different parts of the world.
- The [CDC](#) estimates that one of every 1,000 people with *Campylobacter* infection in the United States develops GBS and that 5-12% of patients with GBS had a recent *Campylobacter* infection.
- Compare this with an estimate of 1-2 per million persons who received the [A H1N1 vaccine in 2009](#). The Shingrix vaccine has a [FDA warning](#) about possible post-immunization GBS with the rate estimated at 3 per million.
- The [CDC](#) does not recommend routine administration of antibiotics for people with *Campylobacter* infections unless they have serious illness or are at risk for serious illness.
- That is appropriate advice when we are not seeing an outbreak of *Campylobacter* and/or GBS. In Peru, where they clearly have a strain with *Campylobacter* LOS mimicry with human neuronal gangliosides, one must weigh the theoretical potential benefit of early *Campylobacter* treatment in an attempt to prevent GBS.
- Azithromycin is the antibiotic of first choice. Fluoroquinolone resistance is common.
- The last 12 months of molecular tests performed at the Sutter Shared Lab are in the table below.

Test	Total Patients	Positive Patients	% Positive
Gi Multiplex Panel	1,014	260	25.6%
Norovirus	1,187	111	9.4%

- Of the 260 patients positive on the GI multiplex panel, 27 were *Campylobacter* positive (10.4%) and 96 were Norovirus positive (36.9%)
- Norovirus is still the most common cause of community-acquired diarrhea.

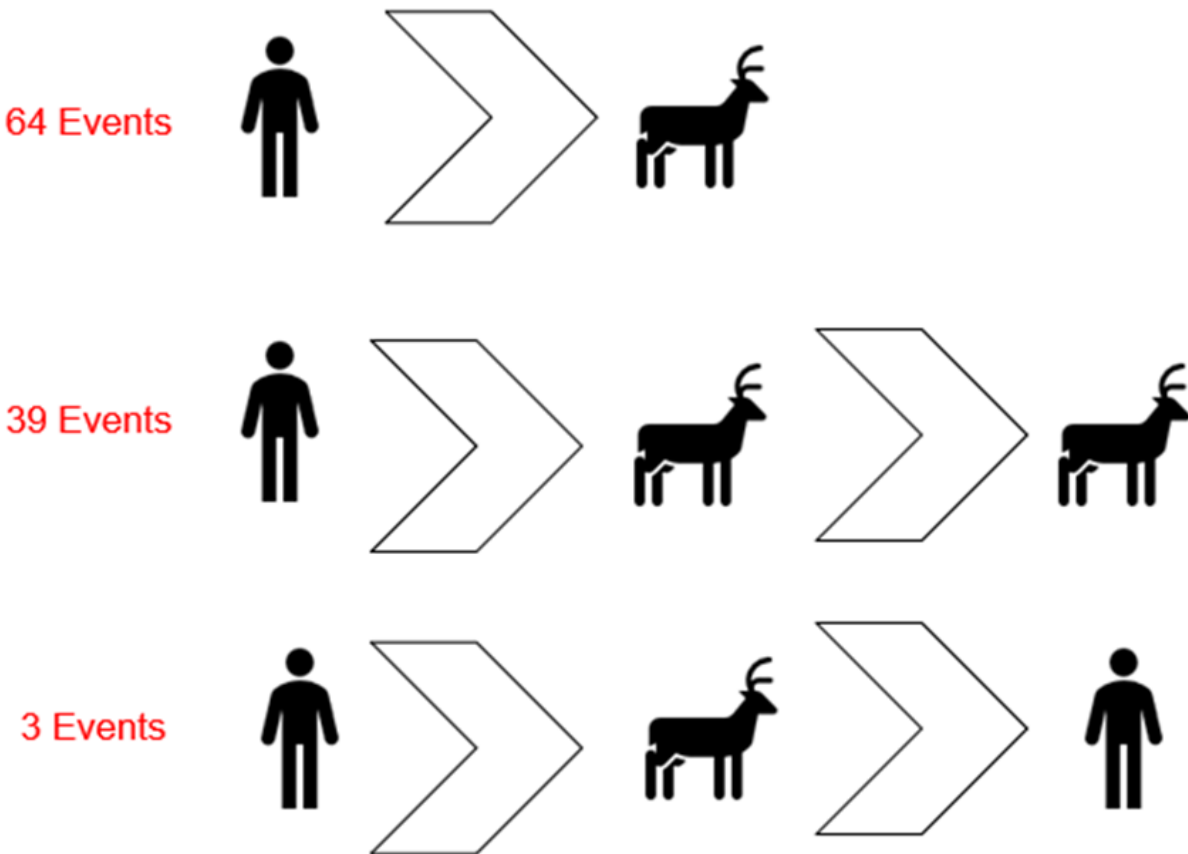
Take Home on Foodborne pathogens, GBS and *Campylobacter* and What You Need to Know

- In 2022, the reported identification of foodborne enteric bacterial pathogens did not decrease compared to 2016-18. Domestically acquired *Campylobacter* infections increased.
- CIDT has improved sensitivity for multiple pathogens and a faster turnaround time but it does not provide any opportunity for genomic sequencing or sensitivity testing. A follow-up stool culture to grow the pathogen identified on the CIDT should be performed for hospitalized, immunocompromised or persistently symptomatic patients.
- Particular strains of *Campylobacter* produce Lipooligosaccharide (LOS) that stimulate antibodies in humans with cross-antigenicity against neural gangliosides. This can result in GBS.
- Peru is experiencing a very large outbreak of GBS that is likely due to *C. jejuni* producing that harmful LOS.
- The CDC does not recommend routine antibiotic treatment for persons with identified *Campylobacter* gastroenteritis.
 - The risk of GBS after a *Campylobacter* infection is one case per 1000 infections.
- Sutter data shows that the GI multiplex panel has a positivity rate of 31% over the last 12 months. *Norovirus* is still the most common organism identified with rates more than three times higher than *Campylobacter*.

COVID-19

- [CID](#) published a preprint on June 30 evaluating the benefit of nirmatrelvir-ritonavir (Paxlovid®) in vaccinated adults 18-50 years old.
 - This was a multicenter, observational, retrospective, propensity-scored, matched analysis.
 - Overall, treatment with nirmatrelvir-ritonavir was associated with a 32% lower 30-day risk of an emergency department (ED) visit, hospitalization or death.
 - In subgroup analysis, the benefit with nirmatrelvir-ritonavir was only seen among COVID-19 patients with certain comorbidities (cancer and/or cardiovascular disease).
 - A risk reduction was not noted in those with chronic lower respiratory disorders such as asthma and COPD.
 - No benefit was observed in patients without serious comorbidities.
- Sylvatic and urban cycles of SARS-CoV-2 have been previously discussed in this newsletter. Pet hamsters spread to humans, followed by ongoing human-to-human transmission was reported in [Lancet March 2022](#). The identification of SARS-CoV-2 in urban rats in New York City was reported in [ASM April 2023](#). White-tailed deer had previously been identified as carrying SARS-CoV-2. They have an estimated population of 30 million and are found in both urban and rural areas.
- [Nature Communications](#) July 10 reports convincing data of the bi-directional transmission between humans and a white-tailed deer sylvatic cycle. This was a large-scale surveillance study covering 26 states and obtaining oral or nasal specimens for testing from 8,830 animals.

- The positivity rate was 10.7% (940 positive). Genomic sequencing was performed on 391 specimens.
- 34 different sub lineages were identified in four variants of concern (77% Delta, 20% Alpha, 2.4% Gamma and 0.6% Omicron).
- 238 white-tailed deer viruses were analyzed and were grouped into 109 clusters of spillover events, where the virus went between humans and deer (pictograph below).
- Out of the 109 clusters, 106 had a human-obtained SARS-CoV-2 specimen identified within the state with at least 99.85% nucleotide identity. This study is the best evidence of transmission from humans to deer, with subsequent transfer back to humans.



COVID Take Home Message:

- Paxlovid® has potential benefit in treating vaccinated 18 to 50-year-old adults with underlying cancer or cardiovascular disease. It did not show any benefit in that same age population without any significant comorbidities or only with asthma or COPD.
- There is continued evidence of transmission of SARS-CoV-2 from humans to other animals, maintenance in an animal cycle, and re-infection of humans.

West Nile Virus

- **West Nile Virus Mosquito and Dead Bird Detections Spread in Placer County**

- The Placer Mosquito and Vector Control District detected its first West Nile virus (WNV) positive mosquito sample and a dead bird on June 21 in the west Roseville neighborhood of West Park.
- Annually, at this time of year, Placer Mosquito detects WNV in the county. Since the initial detection, the district has found 36 additional positive mosquito pools and seven dead birds in West Placer County, Lincoln and Newcastle.
- The Placer Mosquito district encourages residents to take mosquito bite prevention seriously by using repellents with EPA-registered ingredients like DEET and Picaridin, dumping and draining standing water and contacting the district for questions or concerns.
- The district works under a cooperative agreement with the California Department of Public Health (CDPH) to monitor, prevent and manage the risk of mosquitoes and vector-borne diseases in Placer County.
- For questions regarding vector-borne disease clinical diagnosis or treatment, please contact your local health department or [CDPH](#).
- **About West Nile Virus**
 - West Nile virus is a disease spread by mosquitoes that can make people sick and can even cause death. WNV most often spreads to people during the summer and early fall when the mosquitoes that carry WNV are most active.
 - What are the symptoms of WNV?
 - No symptoms in most people. About 80% of people (about four out of five) who are infected with WNV don't have any symptoms and most likely don't know they have been infected with WNV.
 - Milder symptoms in some people. Up to 20% of people (about one out of five) who become infected with WNV will have symptoms that may include fever, headache, body aches, nausea, vomiting and sometimes a skin rash.
 - Symptoms usually develop three to 14 days after being bitten by an infected mosquito. Most symptoms usually only last a few days, although fatigue and weakness can last for weeks or months after being sick.
 - Serious symptoms do develop in a few people. Less than 1% of people (about one out of 150) infected with WNV will become very sick.
 - ✓ In these cases, the virus affects the brain and/or nervous system and can cause encephalitis or meningitis (infection of the brain or surrounding tissue).
 - ✓ Severe symptoms can include high fever, headache, neck stiffness, vision loss, numbness, confusion, muscle weakness, paralysis and coma.
 - ✓ These symptoms may last several weeks, and effects on the brain and nervous system may be permanent. WNV can be fatal.
 - [Source: California Department of Public Health](#)

West Nile Take Home Message:

- California has detected West Nile virus in [90 dead birds in 21 counties](#) and urges residents to take precautions.
- While most people don't have symptoms when infected, it can be serious in less than 1% of people.
- For more information on WNV and how it is diagnosed and treated, visit westnile.ca.gov.

Chlamydia, Gonorrhea, and HPV Indeterminate Molecular Test Results

Since conversion to Roche molecular testing at the Sutter Shared Lab on May 31, the rate of indeterminate test results for Chlamydia/Gonorrhea and HPV has increased for some providers. To reduce indeterminate test results, please review important sample collection information located [here](#).