Yakima Health District BULLETIN

Volume 12, Issue 3 September, 2013

Foodborne Disease Investigation
Norovirus Outbreak at a Dinner Banquet
Yakima County, June 2013

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Flyers/Inserts:

In June 2013, multiple attendees of a single dinner banquet who had developed gastrointestinal illness contacted the Yakima Health District (YHD) within a 24-hour period. YHD launched an investigation to determine the nature and cause of the outbreak, as well as to prevent any further transmission. Using interviews of ill and non-ill participants, a case-control study was conducted to characterize the illness, identify subjects for laboratory testing, and generate hypotheses about possible food vehicles.

Investigation

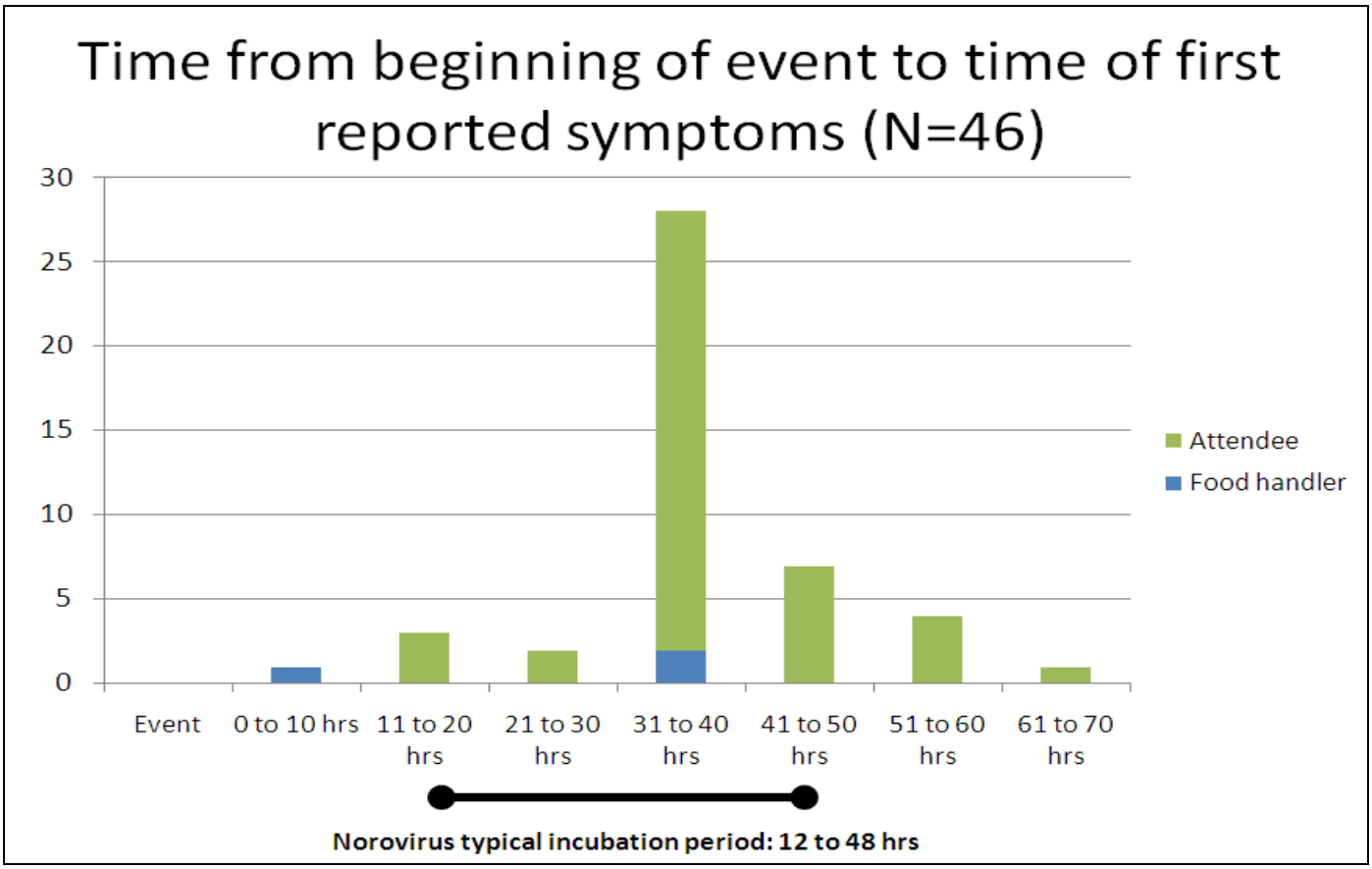
A case of banquet-associated gastroenteritis was defined as any individual who worked, volunteered or attended the implicated event on June 8 and had a stool sample positive for norovirus by RT-PCR or who had symptoms of vomiting, diarrhea or nausea-plus-fever within 72 hours of the event. In total, 86 participants were interviewed. The interview consisted of demographic information, illness history and served foods eaten. Fifty-three (60%) of the participants met the case definition, 29 (34%) were controls, and 4 (5%) were excluded from the analysis because they reported some symptoms, but failed to meet the case definition. The vast majority of interviewed participants (95%) were Yakima County residents. In descending order of frequency, reported symptoms included diarrhea (47 of 53; 89%), vomiting (68%), myalgia (66%), fever (58%), chills (58%) and headache (47%). Excluding food-handlers, time-to-onset from the banquet to the first symptom ranged from 19 to 62 hours (mean 38 hours; Figure on page 2). Among the three food-handlers, time-to-onset ranged from 6.5 to 33 hours. Mean duration of illness was 36 hours (range 8-95 hours). Two ill participants sought medical care; neither was hospitalized or underwent testing of stool or vomitus. No deaths occurred. None of the interviewed cases were noted to work in childcare or food service environments. Stool samples were obtained from four ill participants and all three food-handlers. All seven (100%) were positive for norovirus by RT-PCR. Inferential analysis comparing food histories of ill versus non-ill participants revealed no single food associated with a highly elevated risk of illness.

The following findings were noted from investigation of the food service catering the banquet:

- several attendees reported that meat dishes were served warm-or-cold (suggesting improper hot holding of cooked foods);
- no bare-hand contact with food was reported by or about food handlers;
- the caterer described proper hand washing and sanitizing of counters and equipment; and
- the caterer failed to obtain a permit from YHD to serve food at the event.

Conclusion

This outbreak of norovirus gastroenteritis was most likely due to inadvertent transmission from a food-handler who was infectious (but not yet ill) at the time of the banquet (i.e., the one whose onset was 6.5 hours after the event). Norovirus is relatively easy to transmit; ingestion of a few or even only one viral particle is sufficient to establish infection. The affected food handler probably had contact with multiple foods, thus explaining the inability to identify a



Courtesy of Jasmine Matheson, MPH (Washington State Department of Health)

single culprit in the buffet. Five cases had onset >50 hours after the event, suggesting their infection may have occurred as a result of secondary transmission from another infected participant.

Control Actions

Ill food handlers were excluded from food handling until 24 hours after resolution of symptoms, in accordance with standard public health practice and Washington Administrative Code WAC 246-215-2250(1). The caterer received intensive counseling about permitting prior to events and general food sanitation practices for banquet catering.

Discussion

The differential diagnosis of an outbreak of gastrointestinal illness of suspected food-borne origin includes viruses, bacterial intoxication, invasive bacterial enteritis, and chemical intoxication (e.g., metal salts). In this outbreak, the combination of a 24-48 hour incubation period with the presence of fever, vomiting, diarrhea and a relatively short duration of illness all pointed toward a viral cause. Norovirus accounts for the vast majority of epidemic viral gastroenteritis, with other potential causes including rotavirus, enteric adenovirus, and astrovirus. Bacterial intoxications typically have shorter incubations periods, do not cause fever and tend cause either vomiting (*S. aureus*, *B. cereus*; 1-6 hours to onset) or diarrhea (*C. perfringens*, *B. cereus*; 8-24 hours to onset), but rarely both. *Vibrio parahaemolyticus* could present with a similar timing and symptom complex, but fever is unusual and this infection is almost exclusively associated with ingestion of raw or undercooked shellfish, which was not served at this event. Other invasive bacterial enteritides (e.g., *Campylobacter*, *Salmonella*, *Shigella*, *E. coli*, *Yersinia*) have a longer incubation period (≥24-96 hours) and their duration of illness is several days to a week.

Contributing factors to food-borne outbreaks frequently include ill food handlers, improper hand washing, bare hand contact with food, contaminated product, insufficient hot holding temperature, inadequate reheating, inadequate cooling, and cross-contamination.

Key health care provider responsibilities in suspected common source food-borne outbreaks include:

- notification of YHD upon diagnosing gastroenteritis among several or more members of the same event where

food was served;
- collecting stool and/or vomitus for pathogen testing and coordinating submission of those specimens with YHD;
- advising such patients to save and refrigerate any leftovers from an event for possible future testing; and
- reporting to YHD diagnosis of gastroenteritis due to *E. coli, Campylobacter, Salmonella, Shigella, Vibrio, or Yersinia.*

Key actions YHD takes to investigate and control suspected outbreaks include:
- interviewing affected individuals about exposures to discover possible common exposures across cases;
- interviewing both ill and well attendees (i.e., cases and controls) about intake of food and drink served to support inferences about possible food vehicles;
- collection of additional specimens to support the laboratory investigation;
- when appropriate, restricting activities of affected individuals until they are no longer infectious;
- visiting and interviewing management and staff of implicated food service establishments to evaluate food sources, storage, handling, preparation, and service, as well as food handlers' personal hygiene; and
- coordination of investigation with food safety agencies and vendors to suspend access to contaminated retail or wholesale products.

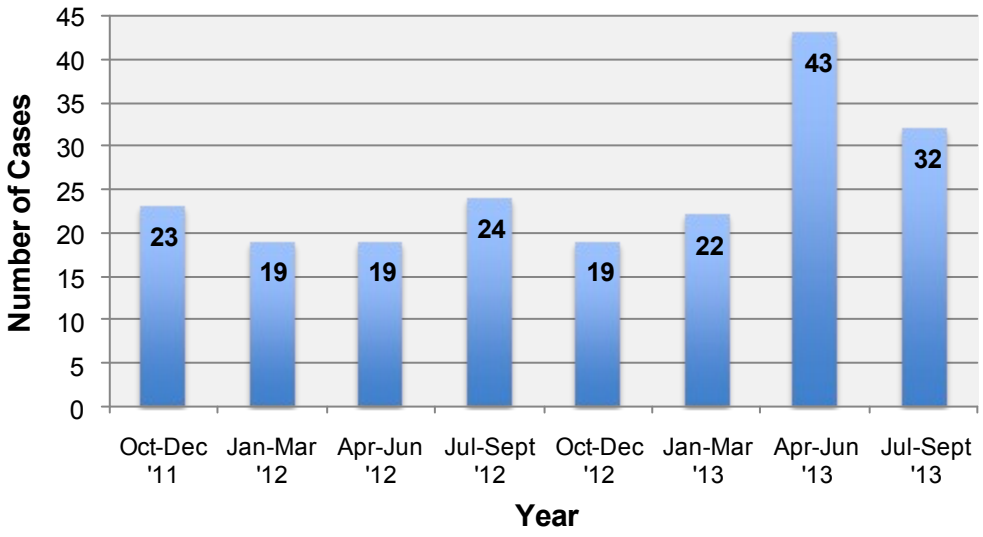
To report a cluster of two-or-more suspected food-borne illnesses among non-household members or any case of culture confirmed bacterial gastroenteritis, please contact YHD at (509) 249-6541.

STD Control Update

Gonorrhea Increase and Recommended Treatment

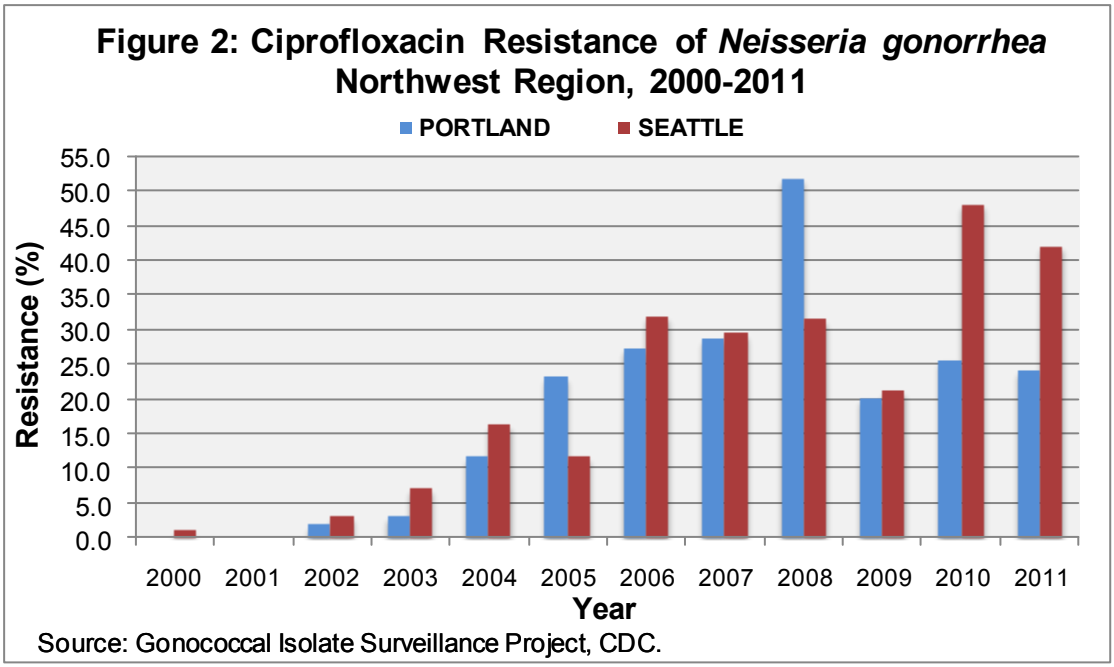
During the second quarter (April – June) of this year, gonorrhea case reports (N=43) were double the average recorded over the preceding six quarters (Figure 1). Annualized projection of case counts to-date through August (131) are also about double the annual average during 2008-2012 (mean = 68, range 34-99). Formal analysis of case demographics and risk factors is still underway at the Washington State Department of Health (DOH). Anecdotal reports from local staff indicate that, although gonorrhea continues to present frequently in men who have sex with men (MSM), women seem to be increasingly involved. Among these women, common risks include multiple partners (sometimes anonymous) and exposure to bisexual MSM.

Figure 1: Gonorrhea Cases in Yakima County
Q4 2011 - Q3 2013



Local STD control staff also report the observation that ciprofloxacin or other fluoroquinolones continue to be given by some clinicians as empiric treatment to patients presenting with urethritis, cervicitis or proctitis. Please recall, however, that fluoroquinolones are no longer the treatment of choice for bacterial STD syndromes, primarily because of increasing frequency and degree of fluoroquinolone resistance by *Neisseria gonorrhea* (Figure 2; page 4). In 2007, the Centers for Disease Control and Prevention (CDC) stopped recommending fluoroquinolones as treatment for gonococcal infections for all persons in the United States. Based upon similar concerns of rising minimum inhibitory concentrations (MICs) for cefixime among gonococcal isolates, CDC recommended discontinuation of *oral* cephalosporin treatment for gonorrhea in 2012. **The recommended regimen for treatment of uncomplicated urogenital, anorectal, and pharyngeal gonorrhea is now combination therapy with a single intramuscular dose of ceftriaxone 250 mg plus either**

a single dose of azithromycin 1 g orally or doxycycline 100 mg orally twice daily for 7 days.



YHD endorses empiric treatment of patients at risk for a sexually transmitted infection who also have a compatible clinical syndrome (e.g., urethritis, cervicitis, proctitis) and recommends adherence to CDC's guidelines for dual therapy. Single dose, directly observed ingestion of azithromycin is the preferred companion to ceftriaxone in this context. In addition to being the best regimen in most cases for both cure of the syndrome and prevention of emergence of further drug resistance, **giving the correct regimen at the time of clinical diagnosis obviates the need for the clinician or YHD to recall the patient for appropriate therapy when gonorrhea is confirmed.**

Expedited partner therapy for contacts of gonorrhea and chlamydia cases remains a critical component of local STD control efforts. See the "Sexually Transmitted Diseases Update" from the March 2013 *YHD Bulletin* for more details, or call David Miller at (509) 249-6532.

Syphilis Increase and Laboratory Diagnostics

Meanwhile, nine primary-and-secondary (i.e., infectious) syphilis cases were confirmed during January-August of this year, compared to only five during the same period in 2012. In addition, 11 cases of recently acquired latent syphilis were diagnosed during this same interval (versus zero during January-August 2012). Syphilis transmission continues to predominantly but not exclusively involve MSM, some of whom are also infected with human immunodeficiency virus.

Primary syphilis typically presents as a painless ulcer with indurated margins in the anogenital region (or rarely the oral cavity). Secondary syphilis usually presents as a diffuse maculopapular rash involving the palms and soles. Condylomata lata, clustered papular lesions in the anogenital region that lack the verrucous appearance of genital warts, may be observed. Systemic signs that are sometimes associated with secondary syphilis include fever, superficial lymphadenopathy, and (rarely) meningeal signs or hepatitis. **For disease control purposes, YHD recommends that empiric treatment of suspected cases with clinically and epidemiologically compatible presentations proceed immediately while results of confirmatory testing are pending. The recommended therapy for infectious syphilis is Bicillin (a 1:1 mix of benzathine and procaine penicillin G), 2.4 million units IM.**

Rapid confirmation of syphilis can be secured by observation of angled, motile spirochetes under darkfield microscopy of ulcer exudate or in aspirates of condylomata lata. Due to low volume and technical requirements, however, few if any clinical settings in Yakima County provide darkfield microscopy. Consequently, confirmation of primary- and secondary syphilis (as well as detection of latent syphilis) relies upon *T. pallidum* antibody enzyme immunoassays (TP-EIAs) as the initial screening test. A positive TP-EIA result can indicate active infection, latent infection, late sequelae, or resolved infection. Serum specimens with positive TP-EIAs undergo reflex testing with a nontreponemal rapid plasma reagin (RPR) or venereal research laboratory (VDRL) titre. This approach to syphilis serology reverses the traditional testing sequence to one of screening first with a qualitative, treponemal test and then re-testing reactive results with a quantitative, nontreponemal test. You may recall that the pre-2010 syphilis serology sequence included an initial VDRL-or RPR titre followed by confirmation with TPPA or FTA-ABS. The current testing sequence was implemented nationwide on the basis of diagnostic yield, cost effectiveness, and

laboratory worker safety.

In asymptomatic patients with negative TP-EIA results, no further testing will occur and they can be considered "not infected" with a reasonably high degree of certainty. In patients for whom the TP-EIA and the RPR is reactive, the positive predictive value for syphilis infection is very high. Such patients merit treatment unless they have documentation of or a reliable history of previous adequate therapy. Previously treated patients, however, should be considered re-infected or relapsed if RPR titers are four-fold greater than prior results or if they have clinical findings consistent with syphilis. In the case that a patient has a positive TP-EIA but a negative RPR, testing in most laboratories will reflex to TPPA as a tie-breaker. If the TPPA is positive, they should be treated for late latent syphilis unless they have a history of previous adequate therapy (Bicillin 2.4 million units every seven days for three doses). If, on the other hand, both the RPR and the TPPA are negative, the patient can be considered negative for syphilis with a reasonably high degree of certainty.

For assistance in recovering a patient's prior syphilis treatment or titer history, please contact Lisa Baldoz at (509) 249-6531. To report a case of gonorrhea, chlamydia, or syphilis, please call YHD at (509) 249-6541.

Anencephaly

The results of an investigation of elevated anencephaly rates in south central Washington conducted by the Washington State Department of Health (DOH) and the Centers for Disease Control and Prevention (CDC) were published in the September 6, 2013 edition of *Morbidity & Mortality Weekly Reports*. In brief, a local health-care provider alerted DOH about an excessive number of anencephaly births she observed at the local delivery setting where she is employed. Subsequent active case finding by DOH identified 27 confirmed neural tube defect-pregnancies occurring during January 2010–January 2013 among women residing in Yakima, Benton, and Franklin Counties. Twenty-three of these were anencephalic. The corresponding regional rate for anencephaly was four times higher than the national rate (8.4 versus 2.1 per 10,000 live births, $P<0.05$). The regional spina bifida rate was non-significantly lower than the national rate (1.3 vs 3.5, $P>0.05$)

A case-control study of medical records was carried out. It included extraction of sociodemographic characteristics, maternal and paternal occupations, maternal smoking and alcohol use, pregnancy health conditions (e.g., anemia, diabetes, or infectious diseases), parity, gravidity, pre-pregnancy height and weight, medication use (including over-the-counter remedies, vitamins, and folic acid supplementation), and well-water source. No statistically significant differences were identified between cases and controls, and no clear cause of the elevated prevalence of anencephaly was found.

CDC, DOH and YHD recommend the following:

- Clinicians should educate women of child-bearing age about the importance of folic acid supplementation prior to pregnancy and during conception (e.g., 400-600 micrograms per day).
- Residents and, where appropriate, landlords should monitor private wells annually for bacteria and nitrate concentrations.

Active surveillance for new cases continues under the expertise of DOH's Office of Non-Infectious Conditions Epidemiology. YHD expresses its appreciation to Mandy Stahre, PhD (CDC Epidemic Intelligence Service Officer), and the rest of that Office's staff for their ongoing leadership and support to Yakima County in this issue.

MMWR link: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6235a5.htm?s_cid=mm6235a5_w

Methemoglobinemia

The Lower Yakima Valley Groundwater Management Area (GWMA) is a Yakima County-led multidisciplinary effort involving representation from relevant government agencies, agriculture professionals, and civil society. Its purpose is to achieve groundwater nitrate concentrations below state drinking water standards. Of equal importance is maintaining drinking water that is free from contamination with harmful microorganisms that can cause gastrointestinal illness. Groundwater may become contaminated with nitrate due to its presence in fertilizers and manure. Under the wrong circumstances, nitrates or microorganisms can percolate or run off into groundwater through rain or irrigation. Private residential water wells may be at increased risk of contamination due to their location and construction. One particular concern with respect to nitrates in drinking water is the potential for methemoglobinemia to

occur among very young children who ingest high levels of nitrate. Although YHD is not aware of even a single case of methemoglobinemia associated with exposure to private well water, we think it is prudent to review it here briefly.

Methemoglobinemia occurs when the ferrous (Fe2+) heme in hemoglobin is oxidized to ferric (Fe3+) heme during the reduction of nitrate to nitrite. Ferric heme is unable to bind oxygen. This reduces oxygen carrying capacity and results in functional hypoxemia, even though PaO2 and total hemoglobin levels may be normal. Typical symptoms of early or mild methemoglobinemia include bluish skin discoloration, headache, fatigue, dyspnea, and lethargy. As the extent or duration of heme oxidation progresses (e.g., >30% of total hemoglobin), respiratory depression, altered mental status, cardiovascular collapse, seizures, or even death may occur.

Rarely, methemoglobinemia can also occur among individuals of any age who have methemoglobin reductase deficiency or who are exposed to certain medications or chemicals (e.g., dapsone, lidocaine-class anaesthetics, nitric oxide, nitrates, aniline dyes).

Evaluation of methemoglobinemia should focus upon assessment of tissue oxygenation, inquiry about possible medication or chemical exposures, and laboratory testing. The laboratory diagnosis of methemoglobinemia is based upon analysis of its absorption spectrum, which peaks at 631 nm. Methemoglobin detected by a co-oximeter should be confirmed by the specific Evelyn-Malloy method.

Clinical management of acquired methemoglobinemia depends on the extent of heme oxidation. When methemoglobin represents ≤20% of total hemoglobin, removal of the offending drug or chemical and ensurance of nitrate-free drinking water is typically sufficient. When objective signs of tissue hypoxia are present or >20% of hemoglobin is oxidized to methemoglobinemia, treatment with methylene blue is recommended, along with consideration of exchange transfusion if clinical manifestations are severe.

For prevention, owners or users of private wells should test their drinking water at least once per year for nitrate (and coliform bacteria), particularly those systems serving pregnant women or infants less than six months old. If a well is found to contain bacteria, nitrate or other contaminants, DOH and YHD can work closely with the water system manager to resolve the problem. Meanwhile, users of a contaminated well should obtain drinking water from an alternate source while remediation is underway.

For additional information about drinking water and private wells, contact the Yakima Health District's Environmental Health Help Desk, (509) 249-6508 or email yhd@co.yakima.wa.us.

Information Resources

Lower Yakima Valley Groundwater Management Area
http://www.yakimacounty.us/gwma/

DOH Drinking Water
http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater.aspx

CDC Drinking Water
http://www.cdc.gov/healthywater/drinking/private/wells/diseases.html

HCV Counseling Clarification

In the June 2013 edition of the *Bulletin*, Table 1 (Typical Elements of HCV Baseline Evaluation) includes counseling hepatitis C virus (HCV) infected patients that marijuana smoking is associated with a risk of progression to advanced liver disease. A recently published study following over 600 HIV/HCV co-infected patients *"found no evidence for an association between marijuana smoking and significant liver fibrosis progression in HIV/HCV coinfection. A slight increase in the hazard of cirrhosis and End Stage Liver Disease with higher intensity of marijuana smoking was attenuated after lagging marijuana exposure, suggesting that reverse causation due to self-medication could explain previous results."* While marijuana smoking may carry other risks, this study would suggest that progression of HCV-related liver disease might not be one of them.

Source: Brunet L, Marijuana Smoking Does Not Accelerate Progression of Liver Disease in HIV–Hepatitis C Coinfection: A Longitudinal Cohort Analysis. *Clin Infect Dis* 2013; 57(5):663–70.

YAKIMA HEALTH DISTRICT

1210 Ahtanum Ridge Drive
Union Gap, WA 98903

Reporting Line: (509) 249-6541
After hours Emergency: (509) 575-4040 #1
Toll Free: (800) 535-5016 x 541

Confidential Fax: (509) 249-6628

http://www.yakimapublichealth.org

Notifiable Condition *(includes confirmed and probable cases)*	Cases Jan - Aug 2013	Cases Jan - Aug 2012	Cases Jan - Aug 2011	Total Cases by Year 2012	Total Cases by Year 2011
Campylobacteriosis	109	63	89	108	122
Chlamydia	921	858	819	1302	1224
Cryptosporidiosis	3	1	0	5	1
Genital Herpes - Initial	41	41	51	61	74
Giardiasis	6	10	12	15	16
Gonorrhea	94	51	60	81	99
Hepatitis A acute	3	2	0	2	0
Hepatitis B acute	0	0	0	0	0
Hepatitis B chronic	*NA	5	6	7	8
Hepatitis C acute	0	2	0	2	0
Hepatitis C chronic	*NA	118	137	176	206
HIV/AIDS Cumulative Living	188	184	178	185	182
HIV/AIDS Deaths	2	6	0	6	4
HIV/AIDS New	4	8	5	9	12
Meningococcal Disease	0	2	0	2	0
Pertussis	117	365	1	493	10
Salmonellosis	23	17	15	26	18
Shigellosis	3	0	6	1	11
STEC (enterohemorrhagic E. coli)	16	5	7	7	10
Syphilis - Primary and Secondary	9	5	8	6	9
Tuberculosis	1	4	6	5	6

*NA=Not Available

Notifiable Conditions Summary Jan - Aug 2013

October 23, 2013
WA State Annual TB Educational Conference

7:30 –8:00	REGISTRATION & BREAKFAST *(Moderator: SheAnne Allen)*
8:00-8:05	**Welcome and State of the State** SheAnne Allen, MPH Washington State TB Controller Washington State Department of Health
8:05-9:05	**KEYNOTE: Global TB Innovations and their Potential Impact to Washington's Communities.** Michael Kimerling, MD, MPH Bill and Melinda Gates Foundation
9:05-9:30	**WA State TB Epidemiology** Shawn McBrien, MPH, Epidemiologist Washington State Department of Health TB Program
9:30-10:00	**Pediatric TB Refresher** Scott Lindquist, MD, MPH Washington State TB Program Medical Consultant
10:00-10:10	**BREAK**
10:10-11:00	**Understanding the Laboratory Network in Washington** Faciliator: Brian Hiatt, Washington State Public Health **Lab Panel:** Alla Ostash, TB Laboratory Lead, Washington State Public Health Lab Paul Swenson, Public Health Seattle-King County Lab; Carolyn Wallis, Lead TB Technician, Harborview Lab; Glendon Pfugrath, Technical Supervisor Microbiology Laboratory Corporation of America
11:00-Noon	**Update on New TB Drugs and Regimens: Bedaquiline and the 12 Dose Regimen** Sundari Mase, MD, MPH, Centers for Disease Control

12:00–1:00pm **WORKING LUNCH & NETWORKING**

1:00-1:10 **Curry International Tuberculosis Center Update**
Kay Wallis, MPH, Special Projects Manager

1:10-2:10 **Controlling TB-The View from the Correctional Side**
Tara Wildes, Chief Jacksonville Sheriff's Office, Florida

2:10-2:30 **Refugee Youth Visual Stories**
Erika Berg, Refugee Youth Empowered

2:30 – 3:00 **EVALUATION & CLOSURE**

WA State TB Program LHJ Business Meeting

(Attendance: LHJ staff only)

3:00-3:10 **History of the MDR Workgroup**
SheAnne Allen, MPH, Washington State TB Controller

3:10-4:10 **Update from MDR/XDR workgroups**

4:10-4:20 **FQHC Survey results**
Lisa Skow, Seattle University Student Intern

4:20-4:30 **EVALUATION & CLOSURE**