

Epi-Log & VacScene

The Communicable Disease Prevention Quarterly

Epi-Log: Public Health Investigates *Salmonella* Outbreak Linked to Pork

Public Health – Seattle & King County, with assistance from the Washington State Department of Health (WA DOH) and Centers for Disease Control and Prevention, continues to investigate a large outbreak of serotype *Salmonella* I 4,[5],12:i:- associated with pork. As of October 29, there are 184 cases (105 are King County residents; 11 other WA counties are also affected), with illness onset dates ranging from April 24 to October 6

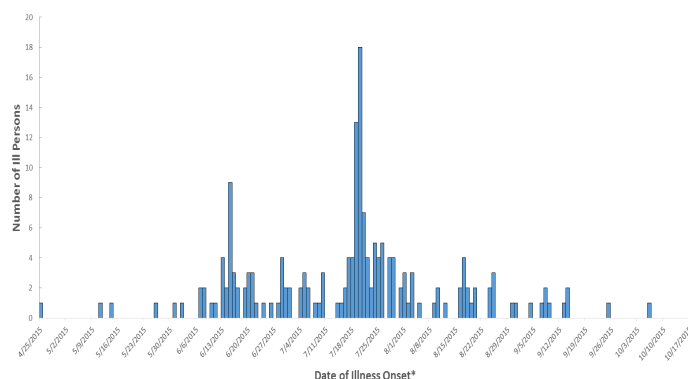


Figure 1. Persons infected with outbreak strains of *Salmonella* I 4,[5],12:i:-

(Figure 1). Forty-nine percent of cases are female, and the median age is 34 years (range <1 to 90). Sixteen percent of cases were hospitalized with no deaths reported. Cases linked to this outbreak were infected with identical or

closely related *Salmonella* serotypes based on pulsed-field gel electrophoresis (PFGE).

Several group events attended by outbreak-associated cases, including at least 17 pig roasts, have implicated a slaughter facility in Washington State as a common pork supplier. Staff from the WA DOH Communicable Disease, Food Safety and Environmental Health programs visited the facility in July. Sampling of the environment and pork products yielded multiple specimens that tested positive for the *Salmonella* outbreak strains. The slaughter facility issued two voluntary recalls in mid-to-late August, resulting in 639,642 pounds of recalled pork products. The facility ceased operations and has not yet reopened.

Though the last known onset of illness is October 6, Public Health continues to monitor for cases that may be linked to this outbreak. Healthcare providers seeing patients with unexplained gastroenteritis should take a thorough food history including a history of recent pork consumption, especially pig roasts. It is especially important to collect stool samples for bacterial culture. Please contact Public Health 24/7 with any questions or concerns at (206) 296.4774.

Public Health
Seattle & King County



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Epi-Log: Pets and *Salmonella*

Approximately 42,000 human cases of salmonellosis are reported annually in the United States. Pets - including baby poultry, reptiles, amphibians, hamsters, guinea pigs, and hedgehogs – and the foods these animals are fed, are a common source of *Salmonella* and have been associated with several multistate outbreaks in recent years (Figure 2.) In 2015, an outbreak of *Salmonella* Muenchen linked to crested geckos kept as pets caused 22 cases in 17 states (2 WA cases outside King County) 14% of cases were hospitalized. Also this year, four multistate outbreaks were linked to baby poultry, resulting in 252 reported cases in 43 states (9 WA cases outside King County) and 63 hospitalizations.

Bearded dragons and hedgehogs are among pets mentioned by recent *Salmonella* cases in King County. Both have been associated with national outbreaks in previous years, and cases are expected to continue at low levels as a result of the inherent risk of *Salmonella* colonization in these animals. The latest hedgehog-associated case in King County occurred in a teenager who had recently purchased a hedgehog; the hedgehog tested positive for a *Salmonella* strain that matched both the teenager's strain and the 2012 hedgehog-associated outbreak by genetic fingerprinting.

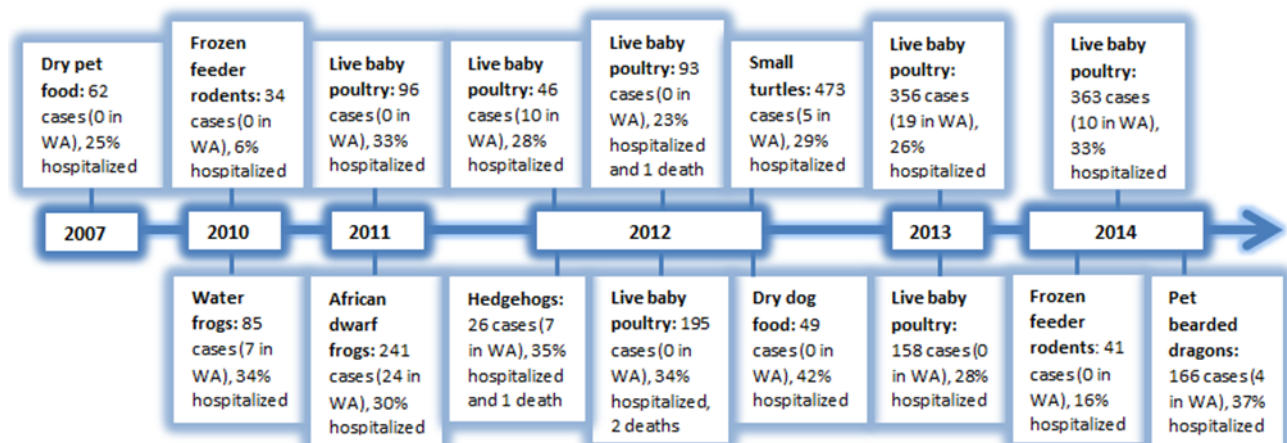
King County is one of only a few local health jurisdictions that have a Pet Business Code (Board of Health Title 8) to control and prevent the spread of zoonotic diseases, including *Salmonella*, in pet businesses and facilities. The code is enforced by the Pet Business Program in

the Environmental Health Services Division of Public Health and requires pet shops, commercial kennels, pet daycares, pet grooming facilities including mobile groomers, animal shelters, poultry retailers and pet food retailers to be permitted. Public Health inspects new facilities before they open for business, and roughly 380 existing permitted facilities are inspected annually. Inspections focus on regulatory requirements and illness prevention education, including provision of signage and pamphlets. The code requires that businesses/facilities:

- Give written information about preventing diseases from pets to all purchasers/adopters.
- Post information about the risk of *Salmonella* near reptile/amphibian and live poultry displays.
- Post handwashing signage and provide readily accessible handwashing facilities or hand sanitizing stations if customers are allowed to handle pets for sale or adoption.
- Post safe customer handling instructions if they sell pet foods/treats requiring refrigeration or freezing.
- Have an infection control plan (ICP) if there are animals on the premises.
- Comply with animal care requirements, and sanitation, disinfection, waste disposal, food storage, and facility standards.

A 2013 survey of pet businesses showed that the Public Health inspections were well-received and assisted in

Figure 2. Recent *Salmonella* Outbreaks Related to Pets or Pet Products



Epi-Log: Pets and *Salmonella* (Cont'd)

implementation of the regulations described above.¹ In addition to prevention measures at the commercial level, clinicians play a valuable role in providing *Salmonella* and other zoonotic disease prevention counseling, particularly to high risk patients such as pregnant women, infants and young children, the elderly, or households with an immune suppressed person. The Centers for Disease Control and Prevention recently revamped their [Healthy Pets Healthy People website](#), with user-friendly searches by animal, disease or risk group. The site also contains a variety of printer-friendly posters and other infographics.

¹ Wierenga J1, Thiede H, Helms L, Hopkins S. *Acceptance, Benefits, and Challenges of Public Health-Oriented Pet Business Regulations in King County, Washington* J Public Health Manag Pract. 2015 May 27.

From the Literature: Measles Vaccine Provides Added Benefits by Preventing Other Serious Infections

Using population-level data, new research concludes that measles infection causes long-term immunosuppression, lasting up to 3 years. The study found that non-measles infectious disease mortality in high-income countries is tightly coupled to measles incidence at this lag, in both the pre- and post-vaccine eras. This is consistent with recent experimental work that attributes the immunosuppressive effects of measles to depletion of B and T lymphocytes (measles-associated immune memory loss). These data provide an explanation for the long-term benefits of measles vaccination in preventing all-cause infectious disease. Because infection with the measles virus may suppress the immune system for up to 3 years, the protection afforded by vaccination might extend to more than just measles.

Source: Mina JM, et al. *Long-term measles-induced immunomodulation increases overall childhood infectious disease mortality*. Science 8 May 2015: Vol. 348 no. 6235 pp. 694-699

Did You Know?

Effective November 9, 2015, Quest Diagnostics will no longer offer stand-alone Hepatitis C virus (HCV) antibody screening. The prior HCV antibody-only screen, test code 8472(X), will now reflex (if the antibody screen is reactive) to an RNA detection by polymerase chain reaction (PCR) assay.

For more information on this and other HCV-related topics, please refer to [Test & Cure](#), the HCV Coalition's new quarterly newsletter.

VacScene: Nine-Valent Human Papillomavirus (HPV) Vaccine Clinical Q & A

Q: What is nine-valent HPV vaccine (9vHPV)?

Three HPV vaccines are licensed by the Food and Drug Administration (FDA). The bivalent HPV vaccine (Cervarix) prevents the two HPV types, 16 and 18, which cause 70% of cervical cancers as well as vaginal, vulvar, penile, anal and oropharyngeal cancers. The quadrivalent HPV vaccine (Gardasil) prevents four HPV types: HPV 16 and 18, as well as HPV 6 and 11, which cause 90% of genital warts. Quadrivalent vaccine has also been shown to protect against cancers of the anus, vagina and vulva. 9vHPV is a nine-valent human papillomavirus (HPV) vaccine (Gardasil 9) that was licensed for use in males and females in the US in December 2014. 9vHPV protects against high risk (oncogenic) strains 16 and 18, 6, 11, and five additional high risk strains (31, 33, 45, 52, 58), which account for another 10% of HPV-associated cancers in women and men. In March 2015 the Advisory Committee on Immunization Practices (ACIP) incorporated 9vHPV into its [HPV vaccination recommendations](#). ACIP has not expressed a preference for one HPV vaccine over another, however only quadrivalent and nine-valent HPV vaccines are licensed in use for males.

VacScene: HPV Clinical Q & A (Cont'd)

Q: What are the current recommendations for 9vHPV?

ACIP recommends HPV vaccination for all children beginning at age 11-12 years; children aged 9-10 years may also be vaccinated. ACIP also recommends HPV vaccination for females aged 13-26 years and males aged 13-21 years who have not started or completed their series; males aged 22-26 years may also be vaccinated. Persons who are immunocompromised (including those with HIV infection) and men who have sex with men are also recommended to receive the HPV vaccine series through age 26 years.

Q: Why aren't HPV vaccines licensed and recommended for adults 27 years and older?

By age 18, 50% of the US population have been infected with one or more HPV strains; approximately one-third of 14-19 year olds infected with HPV are infected with high-risk HPV types. ACIP's HPV vaccination recommendations target younger age groups to promote immune protection *prior* to initial and peak HPV exposure. Studies also show HPV vaccine is more immunogenic in younger adolescents compared to older adolescents and adults.

HPV vaccination rates among adolescents remain low. According to the CDC's [2014 National Immunization Survey-Teen](#) summary, only 39.7% of females and 21.6% of males in the US aged 13-17 years reported receiving the 3-dose HPV series. Washington State's 2014 coverage rates were only slightly higher: 43.8% of females and 24.6% of males aged 13-17 years reported receiving the 3-dose HPV series.

HPV vaccines were studied for safety and efficacy in people aged 9 through 26 years. 4vHPV was also tested and found safe in adults aged 27 through 45 years, but vaccine effectiveness data were inconclusive because numerous study participants were already infected with one or more of the HPV types found in the vaccine. Future studies may be better able to determine the efficacy of HPV vaccine in adults 27 years of age and older.

Q: Many patients have already started or completed their series with either the bivalent or quadrivalent HPV vaccine formulations. Should those patients receive nine-valent HPV?

ACIP has not expressed a preferential recommenda-

tion for persons who already started the 3-dose series with 2vHPV or 4vHPV to complete the series with 9vHPV. Females may start or continue the series with 2vHPV, 4vHPV, or 9vHPV. Males may start or continue the series with 4vHPV or 9vHPV. Providers should offer any available HPV vaccine to immunize their patients according to ACIP recommendations.

There is no ACIP recommendation at this time for persons to receive more than three total doses of HPV vaccine. For example, individuals who received two doses of 4vHPV and one dose of 9vHPV to complete the 3-dose series are not recommended to receive additional doses of 9vHPV.

Q: What are the dosing intervals for 9vHPV?

For all HPV vaccines, the *recommended* intervals are at least 1-2 months between doses #1 and #2, and 6 months between doses #1 and #3. The *minimum* intervals

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VacScene: HPV Q & A (Cont'd)

are 4 weeks between doses #1 and #2, 12 weeks between doses #2 and #3, and 24 weeks between doses #1 and #3. If dose #3 is inadvertently given only 16 weeks after dose #1 and 12 weeks after dose #2, it may be counted as valid.

There is no accelerated vaccination schedule. The series should not be restarted if there is a delay between doses.

Q: What are the side effects of 9vHPV? Who should not receive the vaccine?

9vHPV was well-tolerated among the 15,000 participants in pre-licensure studies and its safety profile is similar to 4vHPV. The most commonly reported adverse events included soreness, redness or swelling at the injection site. Headache and fever were less commonly reported.

Anyone with a history of a severe (life-threatening) reaction to a previous HPV dose, or to a vaccine component, including Baker's yeast, should not receive HPV vaccine. 2vHPV should not be administered to anyone with an anaphylactic latex allergy. HPV vaccines are not recommended for women who are pregnant. Breast-feeding women can safely get the vaccine. Anyone who is moderately or severely ill should delay HPV vaccination.

9HPV Resources

for Health Care Providers:

[9vHPV vaccination recommendations](#) (CDC)

[Supplemental HPV vaccination clinical guide for providers](#) (CDC)

[9vHPV package insert](#)

[9vHPV Vaccine Information Statement](#)

[Ask the Experts HPV page](#)
(Immunization Action Coalition)

[Human papillomavirus \(HPV\): Questions and answers](#) (IAC)

VacScene: Standards for Adult

Immunization Practice

Immunization awareness has traditionally centered on the needs of infants and children, however adults across various age groups and health conditions are also at risk of serious diseases such as shingles, pneumococcal disease, pertussis and flu, and need immunizations to protect themselves and those around them. Unfortunately, *adult vaccination coverage* remains *low* for most routinely recommended vaccines and well below [Healthy People 2020 targets](#). According to the [CDC's 2013 National Health Interview Survey](#), only 17.2% of adults 19 years of age and older reported receiving a dose of Tdap (62.9% reported receiving a dose of any tetanus toxoid-containing vaccine) during the past 10 years and just 24.2% of adults over the age of 60 years reported ever receiving zoster (shingles) vaccine. It is a similar story for pneumococcal vaccination coverage among adults aged 65 or over. While the Healthy People 2020 target is 90%, rates currently stand at 59.7%.

Strong provider recommendation is crucial to raising awareness of adult vaccination needs and promoting immunization as a core preventative health measure across the lifespan. In fact, several studies indicate that provider recommendation is the number one factor influencing vaccination decisions. The [Standards for Adult Immunization Practice](#), a 2014 report published by the National Vaccine Advisory Committee (NVAC), aims to address large gaps in public knowledge about recommended adult immunizations, extremely low adult immunization coverage rates, deficits in strong provider recommendations and missed opportunities to vaccinate during health care encounters.

The standards call on health care providers at every health care visit to:

- **Assess** the patient's immunization status; clinics should implement protocols and activate electronic health record (EHR) prompts to help providers meet this standard.
- **Strongly recommend** needed immunizations, highlighting benefits to self and others as well as risks associated with not vaccinating; providers should tailor their recommendation to address any patient concerns.
- **Offer and administer** needed vaccines **or refer** to a nearby vaccination provider at the time they're recommended.

VacScene: Standards for Adult Immunizations (Cont'd)

- **Document** vaccines administered - as well as those given previously - in the state immunization registry ([Washington Immunization Information System](#), or WAIS) and in the patient's chart.
Health care providers and staff should also:
- **Utilize** report functions in their EHR or in WAIS to identify patients due for specific vaccine doses and implement a reminder/recall protocol to bring patients up-to-date. Visit the [WAIS training page](#) for information on reminder/recall reports.
- **Implement policies promoting use of standing orders and immunization-only appointments** to allow patients to catch-up on needed vaccines. [Standing order templates](#) for all ACIP-recommended vaccines are available through the Immunization Action Coalition.
- **Ensure their own immunizations are up-to-date**, in accordance with [ACIP health care personnel vaccination recommendations](#), and consider a campaign to inform patients and families that staff are doing their part to keep everyone protected.

Adult Immunization Resources:

[Adult Schedule by Vaccine and Age Group](#) (CDC)

[Adult Schedule by Medical and Other Indications](#) (CDC)

[Guide to Contraindications and Precautions to Commonly Used Vaccines in Adults](#)
(Immunization Action Coalition)

[Immunization standing orders templates](#) (IAC)

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VacScene: Updates to Yellow Fever Vaccination

Yellow fever virus (YFV) is transmitted to humans through a bite from an infected mosquito, and is endemic and intermittently epidemic in sub-Saharan Africa and tropical South America. The risk of a traveler acquiring yellow fever varies based on season, location, activities, and duration of their travel. For a 2-week stay, the estimated risk for illness attributed to yellow fever for an unvaccinated traveler to West Africa is 50 cases per 100,000 population; for South America, the risk for illness is five cases per 100,000 population. Persons with clinical illness develop symptoms such as fever, chills, headache, myalgias, and nausea and vomiting, and 15% of those will experience a serious form of the disease, which can include jaundice, hemorrhagic symptoms, and shock and organ failure. The case fatality rate for severe yellow fever disease is 20-50%.

Treatment for yellow fever disease is supportive, so prevention through vaccination and use of personal protective measures to prevent mosquito bites is crucial. 17D yellow fever vaccine (YF-Vax, Sanofi Pasteur) is a live, attenuated formulation available in the US and recommended for most travelers aged 9 months and older who are at risk. Vaccine side-effects tend to be mild and may include low-grade fever, headache, and myalgias. Severe reaction is rare but can include hypersensitivity, YF vaccine-associated neurologic disease and YF vaccine-associated viscerotropic disease. Providers must carefully screen for [contraindications and precautions](#) when considering yellow fever vaccination in patients at risk of exposure.

VacScene: Yellow Fever (Cont'd)

Under [International Health Regulations \(IHR\)](#), an international law promoting global public health security, countries may require travelers to submit an International Certificate of Vaccination or Prophylaxis proving yellow fever vaccination upon arrival. Research has shown that one dose of yellow fever vaccine is protective over the lifetime for most people, and in 2014 the World Health Assembly amended IHR to eliminate the requirement for boosters every ten years for persons at ongoing risk. The amendment will be legally implemented in June 2016. Until then, countries may choose to continue requiring proof of vaccination or booster within the last 10 years.

Using the [Grading of Recommendations, Assessment, Development and Evaluation](#) (GRADE) strategy to evaluate data on yellow fever vaccination, the Advisory Committee on Immunization Practices (ACIP) updated their vaccination recommendations, which were published in the [June 19 MMWR](#). These revised recommendations state that:

- A single dose of yellow fever vaccine provides long-lasting protection and is adequate for most travelers
- Women who were pregnant when vaccinated against yellow fever vaccine should receive one booster dose prior to next travel with risk of yellow fever infection
- Persons who were vaccinated against yellow fever and later receive a hematopoietic stem cell transplant (HSCT) likely become seronegative post-transplant, and should receive one additional dose of yellow fever vaccine prior to next travel if immunocompetent
- Persons who were HIV-infected when vaccinated against yellow fever are less likely to have sustained antibody, and should be revaccinated every 10 years if at ongoing risk
- Revaccination for young children, who have seroconversion rates similar to other age groups, is not recommended unless another risk factor is present
- A booster dose may be given to travelers who received their last dose of yellow fever vaccine at least 10 years previously and who will be in a higher-risk setting based on season, location, activities, and duration of their travel. This would include travelers who plan to spend a prolonged period in endemic areas or those traveling to highly endemic areas such as rural West Africa during peak transmission season or an

area with an ongoing outbreak.

- Laboratory workers who routinely handle wild-type yellow fever virus should have yellow fever virus-specific neutralizing antibody titers measured at least every 10 years to determine if they should receive additional doses of the vaccine. For laboratory workers who are unable to have neutralizing antibody titers measured, yellow fever vaccine should be given every 10 years as long as they remain at risk.

Yellow Fever and

Travel Medicine Resources:

[ACIP recommendations on yellow fever booster doses](#)

[The Yellow Book chapter on yellow fever](#) (CDC)

[WA travel clinics offering yellow fever vaccination](#)

[Shoreland Travax](#)

[International Society of Travel Medicine](#)

[Infectious Disease Society of America](#)

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