IDAHO DEPARTMENT OF HEALTH & WELFARE

Idaho Disease Bulletin

VOLUME 18 NUMBER 3 • SEPTEMBER 2011

Hydatid Disease: Call for Cases

Follow-up to article featured in the April 2010 edition of the Idaho Disease Bulletin http://www.healthandwelfare.idaho.gov/tabid/682/Default.aspx

Idaho's public health epidemiologists at the Division of Public Health would like to hear about any cases of *Echinococcus granulosus* diagnosed in Idaho. This small zoonotic tapeworm is the cause of unilocular hydatid disease in humans and has a complex lifecycle involving primary and intermediate hosts. There has been increased interest in this tapeworm since the detection of the disease in wild game and wolves in Idaho, and concerns that these findings may represent an increased risk to public health.

Domestic dogs or wild canids (*e.g.*, coyotes, foxes, and wolves) are the primary parasite host and shed viable proglottids (packets of eggs) in their feces. Depending on the strain of *E. granulosus*, domestic ungulates (*e.g.*, sheep, goats, swine, cattle, horses) or wild ungulates (*e.g.*, deer, elk, mountain goats) are the intermediate hosts. Intermediate hosts are infected by ingesting eggs during the course of grazing and can develop cystic tapeworm brood sacs, often ≥10 cm in diameter, in organs such as lung and liver. They do not shed eggs into the environment. The phase of the parasite found in the brood sacs is not considered infectious to humans, but can infect canids that consume cystic internal organs from infected intermediate hosts, completing the lifecycle. Humans are functionally intermediate hosts and can acquire *E. granulosus* by consuming the eggs in contaminated food or water or by indirect transmission through contact with egg-contaminated surfaces. Reporting of human infection is not mandated in most states, including Idaho, so the true burden of disease is unknown. A 2011 phone survey of infectious disease physicians in Idaho indicated that the rare case is seen; however, all infections appear to have been acquired abroad, usually by foreign-born persons immigrating to the United States. The last known locally-acquired infection in Idaho was reported in 1977 (believed to be

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Expanded Recommendations for Tdap: Pregnant Women

Preventing pertussis (whooping cough) in very young infants continues to challenge the medical and public health communities. Vaccination of very young infants does not confer immunity during the critical first few months of age when the risk of severe complications and death is the highest; therefore, other protective strategies are needed. One current strategy is to try to ensure immunity of close contacts of a newborn by urging vaccination of parents, grandparents, and other caretakers, as well as ensuring that older siblings are up-to-date on their vaccinations. This strategy, called "cocooning", although logical, has not yet been proven to decrease the risk of pertussis in infants.

Another potential strategy is to continue to emphasize that every adolescent and adult has a single dose of tetanus, diphtheria and acellular pertussis vaccine (Tdap), as currently recommended. This strategy is unlikely to have a major impact on exposure risk to infants, since despite the increasing use of pertussis-containing vaccine in adolescents and adults, pertussis rates in these age groups have continued to rise even after the introduction of adult pertussis vaccination. Achieving high pertussis immunization coverage in adults has been difficult. According to the Centers for Disease Control and Prevention (CDC)'s 2009

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HYDATID DISEASE CONTINUED FROM FIRST PAGE

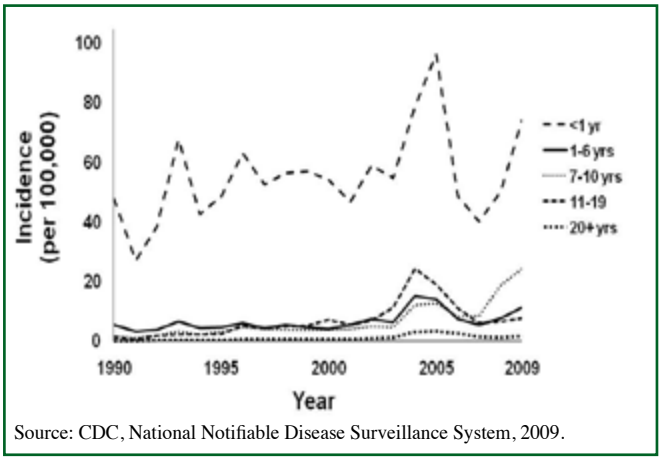
herding dog-associated). Person-to-person transmission is not known to occur. The low number of reports of human disease in Utah and Alaska, where reporting is mandated, suggest that the disease burden is low. During 1990 through 2010, Alaska reported 12 locally-acquired human cases. Although the risk factor contributing to infection was not always documented in the medical record, many cases were linked to dog exposures. Utah reported the last locally-acquired infection in 2005 and continues to document sporadic reports of imported cases. To better understand the burden of human disease in Idaho, the Idaho Department of Health and Welfare, Office of Epidemiology, Food Protection, and Immunization (OEFI) encourages healthcare providers to report any suspected or confirmed case of hydatid disease.

To learn more about this parasite, see: http://www.healthandwelfare.idaho.gov/Health/HunterHealth/tabid/1280/Default.aspx

EXPANDED TDAP RECOMMENDATIONS CONTINUED FROM FIRST PAGE

National Health Interview Survey (NHIS), only 61% of adults aged ≥19 years reported receiving a tetanus-containing vaccine within the past 10 years, and of adults aged 19–64 years who received a tetanus vaccine since 2005 and knew if that vaccine contained a pertussis component, only 51% reported receiving Tdap rather than Td.

Figure. Reported pertussis incidence by age group 1990–2009



Source: CDC, National Notifiable Disease Surveillance System, 2009.

These challenges have raised the question of whether vaccination of pregnant women, in large part to protect their newborns, might be a reasonable strategy. Antibodies to pertussis antigens are passively transferred during pregnancy, but serologic correlates of protection against pertussis are not known. Whether passive transfer of maternal antibodies to pertussis antigens protects neonates against pertussis is not clear, although historical data suggests there is some protection; whether increased titers of passive antibody to pertussis vaccine antigens could potentially substantially interfere with response to DTaP given at 2, 4, and 6 months of age is also of concern. All licensed Td and Tdap vaccines are categorized as Pregnancy Category C agents by FDA. Pregnant women were excluded from prelicensure trials, and animal reproduction studies have not been conducted for Td or Tdap.

Vaccination of pregnant women has appeal since these women routinely receive medical care, are generally very interested in doing what they can to protect their babies from illness, and are generally young and healthy with robust immune systems able to respond to the vaccine.

At the June 22–23, 2011, meeting, CDC's Advisory Committee on Immunization Practices (ACIP), made a provisional recommendation that could significantly alter the way family physicians approach Tdap vaccination. In particular, ACIP voted to recommend that pregnant women who have never received the Tdap vaccine should be immunized during their second trimester (after 20 weeks gestation) or during their third trimester rather than in the immediate postpartum period.

ACIP's provisional recommendation specifies the following stipulations for Tdap:

- if a pregnant woman is up-to-date on tetanus and diphtheria toxoids, or Td, vaccine but has never had Tdap, she should receive Tdap during her second or third trimester, and
- if a woman's history of Td vaccination is unknown, or she never has received it, she should be brought up-to-date with series of immunizations, including one dose of Tdap.

This new recommendation will require education of providers providing prenatal care; a commitment by those providers to offer Tdap vaccine to pregnant women; and coordination with the delivering hospital so that if a pregnant woman chooses not to receive Tdap, or does not receive prenatal care, Tdap can be offered to the mother immediately postpartum.

Idaho continues to see cases of pertussis in young infants each year including infants requiring intensive care. It is hoped that this new recommendation will aid in reducing the impact of this disease on our youngest Idahoans.

How Does Invasive MRSA Impact Idaho?

Before national rates were published in the *Journal of the American Medical Association* in 2007, invasive MRSA incidence estimates were predominantly based on surveillance conducted in single large urban areas or limited to specific populations, facilities, or outbreaks. Although the *JAMA* study produced improved national incidence and mortality rate estimates, surveillance data were collected from largely urban areas, a limitation to the representativeness of the study sample. Due to Idaho's largely rural geography, additional study was undertaken by the Idaho Office of Epidemiology, Food Protection, and Immunization to determine if the national estimates could accurately describe the incidence and epidemiology of invasive MRSA in our state.

In 2008, Idaho passed legislation requiring laboratories to report cases of

Table 1. Descriptive epidemiology of invasive MRSA cases: 18-month incidence and proportions and annual incidence rates

Demographic	Cases reported and proportions (4/16/08-10/15/09)	Annual incidence rate 100,000 pop
Total	166 (100.0)	7.2
Rural residence		
Rural	49 (29.5)	3.5
Urban	117 (70.5)	12.4
Sex		
Male	94 (56.6)	2.4
Female	72 (43.4)	9.4
Age (median)	65.0 Years	
<45	31 (18.7)	3.2
45-59	31 (18.7)	10.4
60-74	60 (36.1)	329.7
75+	44 (26.5)	51.6

invasive MRSA to Idaho public health authorities. To enhance our understanding of the impact of this newly reported condition, reports of invasive MRSA with a specimen collection date from 4/15/2008–10/15/2009 (18 months) were matched to official death records filed from 4/15/2008–12/31/2010. Medical chart reviews were conducted to collect additional patient data on risk factors, underlying conditions, primary diagnosis, and to categorize the infection as healthcare- or community-associated. Annual incidence and mortality rates were calculated from cases with specimens collected during 7/1/2008–6/30/2009; epidemiologic analysis included all cases reported during the 18-month time frame.

Results of Idaho Study of Invasive MRSA incidence and disease severity

Invasive MRSA infection affects primarily urban, older residents of Idaho. Risk of disease was positively related to age, with the lowest rates of disease among residents less than 45 years of age (Table 1). Using the lower bound of the national incidence rate estimate published in *JAMA*, we expected to receive approximately 375 cases of invasive MRSA annually. We received 111 reports from July 1, 2008 through June 30, 2009, the one-year time frame used to calculate annual incidence, resulting in an annual incidence rate of 7.2 / 100,000 population. The Idaho incidence rate was significantly lower than the national estimate of 31.8 / 100,000 population[1] ($p < .0001$). The case fatality rate of invasive MRSA in Idaho was 148.1 / 1,000 cases. The standardized mortality rate of 1.0 / 100,000 population in Idaho was significantly lower than the national rate of 6.3 / 100,000 population ($p < .0001$).

The incidence rate among rural Idaho residents was 3.5 / 100,000 population, significantly lower than the rate among urban Idaho residents of 12.4 / 100,000 population ($p < .0001$). Case fatality rates are independent of disease incidence differences in populations. When considering case fatality differences between rural and urban populations in Idaho, the case fatality rate among rural residents (61.2 / 1,000 cases) was significantly lower than among urban residents (179.5 / 1,000 cases) ($p = .0268$). This is similar to what has been seen in other studies in the United States. Authors have attributed differences in disease incidence and outcomes between rural and urban populations in other states to probability of exposure to infected individuals, socioeconomic factors, health status, occupation, and age. While the Idaho-specific investigation did not address all possible factors that might have an impact on invasive MRSA incidence and severity, it did confirm findings of other studies in which differences in disease incidence by geography were noted.

The annual incidence rate of invasive healthcare-associated MRSA (HA-MRSA) was 5.8 / 100,000 population. The HA-MRSA incidence rate was significantly higher than the invasive community-associated MRSA (CA-MRSA) rate of 0.3 / 100,000 population. CA-MRSA patients tended to be younger (median age = 51.2 years) than HA-MRSA patients and had a higher incidence of illicit drug use and an initial diagnosis of cellulitis. Patients with invasive CA-MRSA infections had significantly fewer days of hospitalization during their infection and had no deaths attributable to MRSA. The significantly lower level of disease severity as measured by length of hospital stay and lack of deaths reported among invasive CA-MRSA patients is an indicator that disease severity is lower in infections associated with community environments compared with healthcare environments. Although other explanations for differences were explored, there were no factors definitively found to be protective among patients with invasive CA-MRSA infections relative to patients with invasive HA-MRSA infections, including geographic location (rural vs. urban).

Antimicrobial susceptibility patterns for invasive HA-MRSA and CA-MRSA infections were tabulated (Table 2). Data correlated with what has been reported nationally and recommended in the Infectious Disease Society of America (IDSA) guidelines for outpatient treatment of MRSA SSTIs. Idaho invasive CA-MRSA infections were less resistant to ciprofloxacin, clindamycin, levofloxacin, and rifampin. IDSA recommends, that for empirical coverage of CA-MRSA in outpatients with SSTI, oral antibiotics including clindamycin, trimethoprim-sulfamethoxazole, a tetracycline, or a linezolid are appropriate. Data from this study indicate trimethoprim-sulfamethoxazole or tetracyclines for treatment of invasive infection would be appropriate, as well as linezolid.

[1]Klevens RM, Morrison MA, Nadle J, et al. Invasive methicillin-resistant *Staphylococcus aureus* infections in the United States. *Journal of the American Medical Association*. 2007;298:1763-71.

Table 2. Percent of invasive MRSA specimens resistant to selected antimicrobial agents

ABX TESTED	CA-MRSA(%)	HA-MRSA(%)	N
Ampicillin	100.0	91.8	55
Cefazolin	100.0	98.8	90
Ciprofloxacin	40.0	79.2	29
Clindamycin	40.0	54.3	126
Daptomycin	0.0	0.0	55
Erythromycin	88.9	89.9	118
Ggentamicin	0.0	2.8	80
Imipenem	66.7	95.7	26
Levofloxacin	28.6	69.6	86
Linezolid	0.0	0.0	65
Rifampin	14.3	1.6	71
Tetracycline	0.0	4.5	120
Trimeth-Sulfa	0.0	0.9	125
AMOX-KCLAV	80.0	100.0	43

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An electronic version of the Rules and Regulations Governing Idaho Reportable Diseases may be found at http://adm.idaho.gov/adminrules/rules/idapa16/0210.pdf.

Current and past issues are archived online at www.idb.dhw.idaho.gov.

CDC Fellows Join Office of Epidemiology, Food Protection, and Immunization (OEFI)

On August 1, 2011, Dr. Carla Britton joined OEFI for a 2-year assignment as a CDC Epidemic Intelligence Service (EIS) Officer. Dr. Britton earned her PhD in epidemiology from the University of Iowa in 2010 while working as a research assistant for the university's sports medicine clinic. Her dissertation topic was risk factors for injury among federal wildland firefighters in the United States. She has published on injury patterns in collegiate swimming in the *American Journal of Sports Medicine*, and on quality of life and perception of shoulder function in patients with rotator cuff disease in Shoulder and Elbow. She earned an MS in Environmental and Public Health from the University of Wisconsin at Eau Claire in 2002, with a thesis on emergency medical services utilization in Sawyer County, Wisconsin. During her tenure here, Dr. Britton will analyze surveillance systems, participate in field investigations, and conduct epidemiologic analyses, as well as assist OEFI in responding to infectious disease reports and outbreaks. For more information on CDC's EIS Program http://www.cdc.gov/eis/index.html.

Ms. Anna Talman, MPH, will join OEFI October 11th for a 2-year assignment as a CDC Public Health Prevention Service (PHPS) Fellow. During 2007–2009, Ms. Talman was a health organization development advisor for the US Peace Corps' International Training and Education Center for Health in Ethiopia, where her primary focus was on strengthening HIV prevention, treatment, and adherence programs. In 2010, Ms. Talman earned her MPH in Global Health from the University of Washington while working as a research assistant examining linkages between the HIV epidemic and the natural environment, and received the University of Washington School of Public Health Omenn Award for academic achievement and commitment to community service in public health. Her first PHPS fellowship year at CDC included assignments to evaluate crisis and emergency risk communication processes, and to conduct epidemiologic and spatial analysis of environmental health issues. While with OEFI, Ms. Talman will be an integral part of the Immunization Program, providing expertise for community partners and evaluating program components to help improve vaccination coverage of Idaho's children. She will also work with the Epidemiology Program on infectious disease surveillance projects. For more information on CDC's Public Health Prevention Service, see http://www.cdc.gov/PHPS/index.html.