

Evaluation of Listeriosis Screening, Reporting and Education Procedures by Obstetricians

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## Abstract

**Objective:** Explore the background behind listeriosis; describe the current epidemiology of listeriosis among pregnant females in Ada, Boise, Elmore and Valley Counties in Idaho, and gain insights into current practices of prenatal care by obstetricians that address listeriosis education and diagnosis.

**Methods:** An evaluative survey was administered to examine obstetrician practice patterns and patient education procedures regarding listeriosis and adherence to reporting guidelines.

**Results:** Both our survey and current literature suggest that listeriosis in Idaho is extremely uncommon. Provider responses highlight a lack of awareness regarding the need for listeriosis reporting and patient education procedures.

**Conclusion:** The survey identified gaps in reporting and patient education procedures that could be improved by reevaluating the current standard of practice. An enhanced effort to educate providers regarding reporting procedures and patient education may improve the current system of care, decreasing the risk for both exposure to and adverse outcomes from *Listeria monocytogenes*.

### Introduction

The epidemiology of listeriosis in Idaho's Health District 4 described in this paper encompasses a period from 2005 through 2009. During this period, only two cases of listeriosis have been reported within Health District 4, which includes Ada, Boise, Elmore and Valley Counties.

While the incidence of disease appears to be extremely rare, the potentially severe consequences of listeriosis require healthcare providers to be aware of signs and symptoms as well as reporting procedures so that public health interventions can take place in the event of a cluster or outbreak. Early detection of a cluster or an outbreak can decrease exposure to others at risk. The cooperation of the medical community is essential to the success of the investigation process.

There is a continued need for the health care community and public health to work collaboratively to ensure the quality of local surveillance systems. Adherence to State reporting requirements and Centers for Disease Control and Prevention (CDC) detection and treatment guidelines are the two ways the health care community can support public health efforts. The risk for adverse outcomes among pregnant females and the recent listeriosis outbreaks in Canada and Massachusetts have prompted public health to evaluate current provider knowledge and standards of practices around listeriosis. This report details the results of a survey provided to local obstetricians in Health District 4. This survey was specifically designed to evaluate current practice patterns and patient education procedures regarding listeriosis and adherence to reporting guidelines.

### Background

In the United States (U.S.), listeriosis is an uncommon, but dangerous foodborne illness that is associated with an estimated 2,500 severe infections and 500 deaths each year (CDC: “Listeriosis,” 2009). The case fatality rate of listeriosis is high, with 20 deaths per 100 cases of illness (“Idaho Disease Bulletin,” 2000). *Listeria monocytogenes*, the causative agent of listeriosis, is a harmful bacteria found in many foods. *Listeria* is pervasive in the environment and is found in soil and water. This bacterium can be easily destroyed through the pasteurization process so exposure most often is the result of consumption of contaminated food products, particularly unpasteurized or raw products such as milk and meat.

Those infected with listeriosis may experience acute febrile illness or gastroenteritis. Listeriosis may also present itself as a flu-like illness and include fever, muscle aches, nausea, diarrhea, neck stiffness, confusion, loss of balance or convulsions. The elderly, immunocompromised persons, pregnant females and neonates are at increased risk for severe illness including meningoencephalitis and septicemia (Lorber, 1997; Jurado et al., 1993).

In the U.S., listeriosis is a leading cause of foodborne related deaths. *Listeria* has been isolated in 15% to 70% of raw vegetables, raw milk, cheese, meats, including fresh, frozen and processed chicken and beef (Farber, 1991). In 2002, a listeriosis outbreak from contaminated turkey deli meat resulted in one of the largest meat recalls in U.S. history due to 54 related illnesses, eight deaths, and three stillbirths or miscarriages throughout nine U.S. states. Following the outbreak, federal regulators issued new, more stringent rules designed to prevent further *L. monocytogenes* contamination of ready-to-eat meat and poultry products (CDC, 2005).

In 2007, FoodNet surveillance data revealed a decrease of 42% in the incidence of listeriosis between 1996 and 1998 (CDC: “MMWR,” 2009). There has been a steady decline in listeriosis related mortality rates, with rates decreasing annually by nearly 4.3% from 1996 through 2005 (Bennion, Sorvillo, Wise, Krishna, & Mascola, 2008). Overall incidence of laboratory-confirmed invasive cases decreased by 24% from 1996 through 2003 and pregnancy-associated disease decreased by 37% during this same period (Voetsch et al., 2007). Proactive prevention efforts in industry, regulation and education suggests a positive association between the enhancement of these efforts and the reduction in incidence of listeriosis (Tappero, Schuchat, Deaver, Mascola, & Wenger, 1995).

Mylonakis, Paliou, Hohmann, Calderwood, and Wing (2002) found that pregnant females are 17 times more likely than other healthy adults to develop listerial bacteremia. Listeriosis can cause miscarriage, spontaneous late-term abortion, stillbirth, premature delivery, serious sickness, or death of a newborn baby (Silver, 1998). Neonatal infections are often severe, with a mortality rate of 25% to 50% (Bortolussi, 2008). It is imperative that pregnant patients be screened if exhibiting symptoms. They should also receive education about this foodborne pathogen from their obstetrician as part of their preventive care plan.

According to Janakiraman (2008), there is no routine screening test for listeriosis during pregnancy, as there is for rubella and some other congenital infections. If a patient is experiencing symptoms of listeriosis, they must consult their doctor. A bacterial culture of blood or spinal fluid can show if a patient is infected with *Listeria*. During pregnancy, a blood test is the most reliable way to find out if the patient’s symptoms are due to listeriosis.

In an attempt to address the lack of routine screening, the national Healthy People 2010 target objective for listeriosis is no more than 0.25 new cases per 100,000 people. In order to

meet this goal, the health care community, public health and food service industry must work collaboratively to identify and implement methods to decrease the risk for exposure and sustained transmission.

Since the year 2000, health care providers, laboratorians, and hospital administrators have been required, according to the Rules and Regulations Governing Idaho Reportable Diseases (IDAPA 16.02.10), to report suspected cases of listeriosis to their local Health District or the Idaho State Office of Epidemiology, Food Protection and Immunizations (OEFI). Reports must be made within three working days of identification. Clinical and reference laboratories must also notify the local health department when laboratory testing yields evidence suggestive of *Listeria*; notification must occur within three working days after the health care provider has been notified.

#### Methods

An evaluative survey was administered to obstetricians to examine practice patterns and patient education procedures regarding listeriosis as well as adherence to reporting guidelines.

##### *Study Population and Method of Survey Distribution*

This survey was conducted within Health District 4, Idaho, which includes Ada, Boise, Elmore and Valley Counties. The Idaho Medical Association (IMA) provided address labels for all IMA registered obstetricians practicing within the counties of the health district. Surveys were mailed to providers with a postage paid return envelope. Obstetricians had the option to mail the survey back or complete it online. A total of 75 surveys were distributed. In an effort to increase the response rate the survey was mailed to the same providers a second time. Twenty-one surveys (28%) were returned. Two of the returned surveys were excluded from analysis because none of the questions were answered. One indicated that the physician was “no longer

practicing” and the other reportedly had “never encountered a case of listeriosis.” In all, 19 (25% of the study population) surveys were included in the dataset.

### *Survey Design*

The survey was designed for distribution to obstetricians and contained six practice pattern related questions and two patient education related questions. This survey was constructed by CDHD staff and subjected to two rounds of peer review before distribution. The questions were primarily multiple-choice (Table 1).

**Table 1: Survey Questions**

<b>Practice Pattern Questions:</b>	<b>Practice Pattern Response Options</b>
1. If my pregnant patient is symptomatic for acute listeriosis (e.g., fever, myalgia, arthralgia, headache, backache, etc.)	
a) Obtain a clinical specimen for bacterial culture.	<ul style="list-style-type: none"> <li>• All of the time</li> <li>• Some of the time</li> <li>• Rarely</li> <li>• Never</li> </ul>
b) Treat empirically with antibiotics without obtaining a clinical specimen for bacterial culture.	<ul style="list-style-type: none"> <li>• All of the time</li> <li>• Some of the time</li> <li>• Rarely</li> <li>• Never</li> </ul>
c) Indicate infection present during pregnancy on the Birth Certificate.	<ul style="list-style-type: none"> <li>• All of the time</li> <li>• Some of the time</li> <li>• Rarely</li> <li>• Never</li> </ul>
2) If listeriosis is suspected as a cause of stillbirth, I	
a) Obtain specimen(s) for bacterial culture and obtain results before filling out the Certificate of Stillbirth.	<ul style="list-style-type: none"> <li>• All of the time</li> <li>• Some of the time</li> <li>• Rarely</li> <li>• Never</li> </ul>
b) Use clinical suspicion alone when filling out the Certificate of Stillbirth.	<ul style="list-style-type: none"> <li>• All of the time</li> <li>• Some of the time</li> <li>• Rarely</li> <li>• Never</li> </ul>
3) If I suspect or confirm that listeriosis is the cause of stillbirth (during 20 or more weeks of completed gestation or fetal weight of 350g or greater), I indicate on the Certificate of Stillbirth (select all that apply)	<ul style="list-style-type: none"> <li>• Initiation Cause/Condition</li> <li>• Maternal Diseases (specify listeriosis)</li> <li>• Chorioamnionitis (if present)</li> <li>• Fetal Infection (specify listeriosis)</li> </ul>

	<ul style="list-style-type: none"> <li>• Other significant causes or conditions</li> <li>• None of the Above</li> </ul>
4) If I suspect or confirm that listeriosis is the cause of neonatal death (<28 days of age), I indicate so on the death certificate.	<ul style="list-style-type: none"> <li>• All of the time</li> <li>• Some of the time</li> <li>• Rarely</li> <li>• Never</li> </ul>
5) I believe that listeriosis cases should be reported to the local or state health department (select all that apply).	<ul style="list-style-type: none"> <li>• When cases are clinically suspected but there is no laboratory confirmation</li> <li>• When there is a laboratory confirmed case</li> <li>• Only when a case is associated with an outbreak</li> <li>• None of the above</li> </ul>
6) If I do not always report listeriosis to local or state health departments, it is because (select all that apply).	<ul style="list-style-type: none"> <li>• I was not aware that listeriosis cases should be reported</li> <li>• I do not want patients contacted by the local public health</li> <li>• I do not know what the health department will do about it</li> <li>• I report it to hospital infection control staff</li> <li>• My concerns regarding HIPAA</li> <li>• The laboratory reports it</li> <li>• Inconvenience</li> <li>• Lack of time</li> <li>• Not required</li> <li>• Not applicable (always reported)</li> <li>• Other (please specify)</li> </ul>
<b>Patient Education Related Questions:</b>	<b>Patient Education Response Options</b>
7) I, or my staff, educate my patients about the risk of listeriosis in the first trimester.	<ul style="list-style-type: none"> <li>• During the first pregnancy only</li> <li>• During both the first and subsequent pregnancies</li> <li>• During subsequent pregnancies only</li> <li>• Neither</li> </ul>
8) If you provide information about listeriosis to your patients, what type of information about listeriosis do you provide? (select all that apply)	<ul style="list-style-type: none"> <li>• Not applicable</li> <li>• Written</li> <li>• Verbal</li> <li>• Refer to website (please specify)</li> <li>• Video</li> <li>• Other (please specify)</li> </ul>

*Data Analysis*

Responses were entered into an Excel database for analysis. A second party validated the dataset by verifying each entry to ensure accuracy prior to analysis. Simple statistics were used to analyze results.

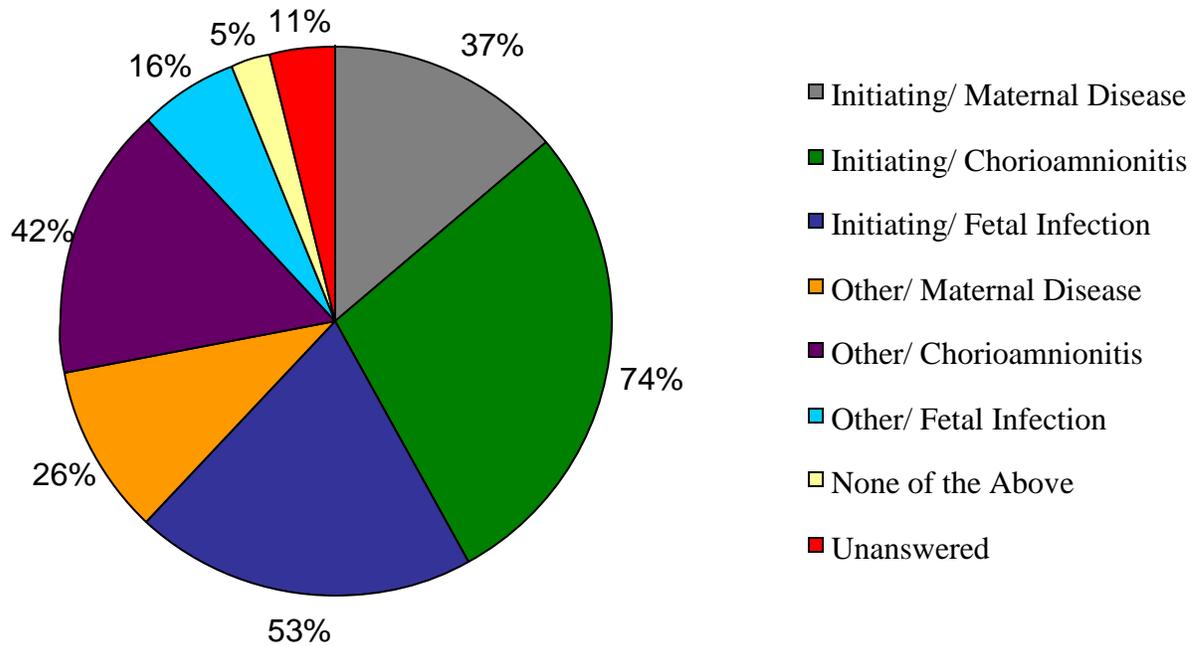
**Results**

The majority (63%) of obstetricians reported that they would rarely or never obtain a clinical specimen for bacterial culture if their pregnant patient exhibited symptoms consistent with acute listeriosis. Only 5% reported that they would treat empirically with antibiotics without obtaining a clinical specimen for bacterial culture. However, 47% stated they would document that infection was present during pregnancy on the Birth Certificate.

When questioned about filling out the Certificate of Stillbirth if listeriosis was suspected as the cause of stillbirth, 68% of obstetricians stated that they would obtain specimens for bacterial culture and obtain results before filling out the Certificate of Stillbirth. Only 21% reported that they would use clinical suspicion alone when filling out the Certificate of Stillbirth.

When asked about reporting procedures on the Certificate of Stillbirth, 74% of physicians reported they would indicate chorioamnionitis as the “Initiation Cause/Condition.” Additionally, 42% also listed chorioamnionitis as “Other significant causes or conditions” and 5% answered “None of the above” (Fig. 1).

Figure 1: Obstetrician Reporting Tendencies on the Certificate of Stillbirth

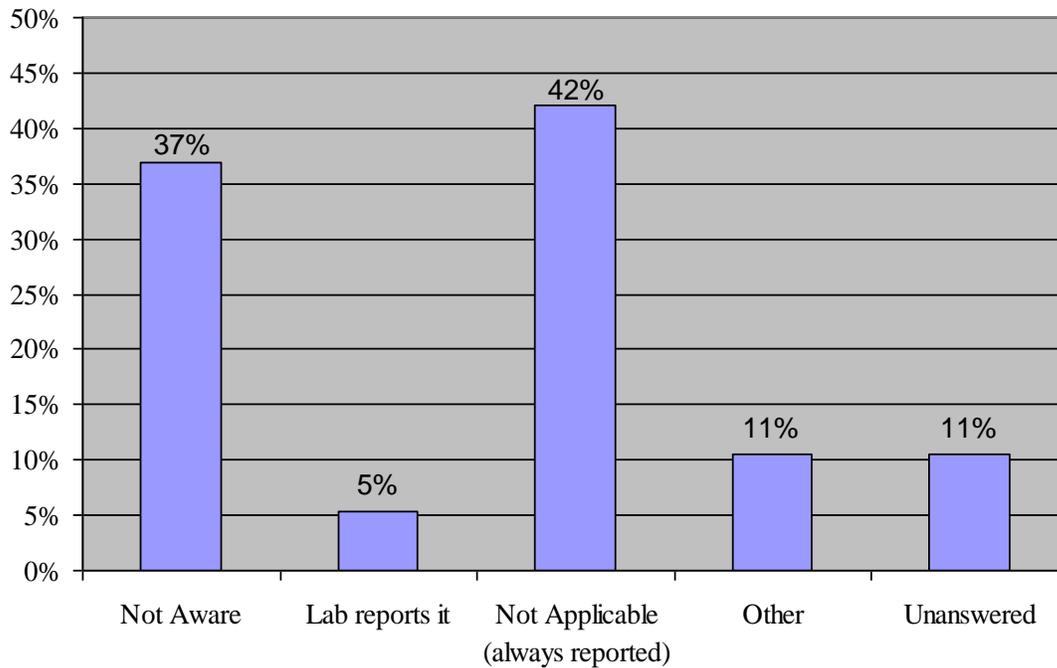


\*Graph exceeds 100% due to multiple choice options

Just over half (53%) of physicians stated that they would document listeriosis on the Death Certificate as the cause of neonatal death. The majority of obstetricians (90%) stated they believe listeriosis should only be reported to local or state health departments when there is a laboratory-confirmed case. The remainder of participants left the question unanswered.

Aside from their belief that confirmed cases should be reported, only 42% of obstetricians stated that they always report listeriosis to their local or state health department. Over a third (37%) of respondents stated that they did not report listeriosis because they were not aware that it was an Idaho reportable disease. Eleven percent did not specify the reason for why they did not report while 5% of respondents said that they do not report because the laboratory reports it (Fig. 2).

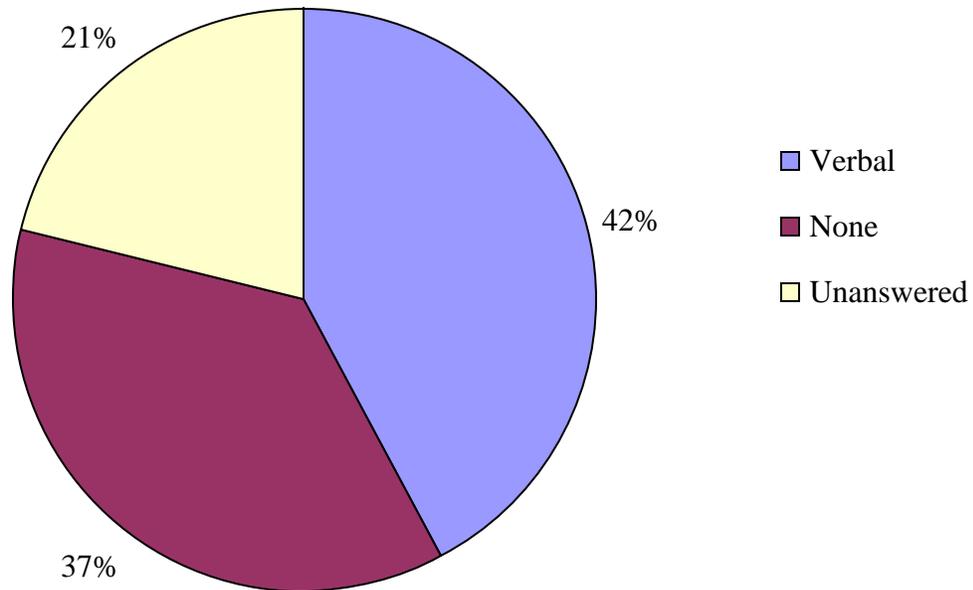
Figure 2: Reasons for Obstetricians Failing to Report Listeriosis



\*Graph exceeds 100% due to multiple answers given by one participant

Roughly, a third (32%) of respondents indicated that they provide patient education about the risks of listeriosis to patients in the first trimester during both their first and subsequent pregnancies. Unfortunately, almost two thirds (63%) stated that they did not provide patient education to their pregnant patients about the risks of listeriosis during pregnancy and 5% left this question unanswered. Of the 32% of respondents who reportedly provide patient education, 42% of them stated that they provide verbal education only (Fig. 3).

Figure 3: Obstetrician Preferred Type of Patient Education Regarding Risk of *Listeria* Infection



#### Discussion

Although studies have found that approximately 5% of healthy adults are infected with *Listeria* at any given time, the results of our survey indicate that listeriosis in Idaho is less common (Lorber, 2005). True incidence of the disease is unknown, but it is likely that some cases go undiagnosed and unreported. Over 25% (N=5) of providers in our survey commented that they had never seen a case of listeriosis in the span of their career in medicine. The low incidence and resulting lack of familiarity with this bacterium likely contributes to the general lack of awareness regarding reporting and perceived need to educate patients about the risk of transmission.

This study gives insight into the current practices and perceptions of obstetricians, but it does have some limitations. The study only includes obstetricians; however, many family

practice doctors and midwives also provide prenatal care. Their perceptions of the risks of listeriosis in their pregnant patients as well as their practices may differ from obstetricians. A low response rate also limits the generalizability of this study across obstetricians as a whole. No descriptive data were collected on survey participants (e.g., licensure, number of years in practice, age, gender, etc.), which also influences the generalizability of the findings.

In summary, this survey identified current gaps in reporting and patient education procedures that should be considered in future disease prevention activity planning by the local health department. Extended efforts to educate providers regarding reporting procedures and patient education may facilitate a positive change the current system of care. Additional study is needed to identify specific gaps in service delivery among obstetricians, family practice physicians and midwives so that appropriate public health measures can be instituted to increase provider awareness regarding the risks of *Listeria monocytogenes* to pregnant patients and the need for detecting and reporting the occurrence of disease.

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