LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases	5
Annual Incidence[a]	
LA County[b]	4.11
California	N/A
United States	N/A
Age at Diagnosis	
Mean	32
Median	34
Range	20–41 years

[a]Cases per 100,000 live births.
[b]Rates calculated based on less than 19 cases or events are considered unreliable.

DESCRIPTION

Listeriosis is a disease caused by infection with *Listeria monocytogenes*, a Gram-positive rod that is found in soil throughout the environment. Listeriosis is often caused by ingestion of foods contaminated with *L. monocytogenes.* Foods often associated with *Listeria* contamination include raw fruits and vegetables; undercooked meat, such as beef, pork, poultry, and pâté; cold cuts from deli counters; and unpasteurized dairy products—milk, milk products and soft cheeses (Mexican-style, Brie, feta, blue-veined, Camembert).

Pregnant women are susceptible because pregnancy causes a suppression of the immune system. The pregnant mother may only experience a mild febrile illness, but can transmit the infection to the fetus. Symptoms of listeriosis include: fever, muscle aches, and sometimes nausea or diarrhea. If infection spreads to the nervous system, symptoms such as headache, stiff neck, confusion, loss of balance, or convulsions can occur. Infections during pregnancy can lead to miscarriage, stillbirth, premature delivery, or infection of the newborn. Often *Listeria* can be isolated from both the mother and the infant.

Pregnant women should avoid foods associated with *Listeria*, particularly cheeses sold by street vendors or obtained from relatives/friends in other countries, where food processing quality assurance is unknown.

Additionally fruits and vegetables should be thoroughly washed. Uncooked meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating.

Although the risk of listeriosis associated with foods from deli counters is relatively low, it is recommended that pregnant women avoid these foods or thoroughly heat cold cuts before eating.

Prevention strategies for healthcare providers include education during prenatal checkups, outreach to Latino communities (where the number of cases has been higher and consumption of unpasteurized soft cheeses may be more common), and food safety notices at food and deli markets.

2014 TRENDS AND HIGHLIGHTS

- Of the five cases of perinatal listeriosis four were single gestations and one was multiple gestation. A total of six babies were exposed in utero; three were born with signs of sepsis, two did not acquire the disease, and one suffered neonatal fatality.
- Two mothers were not diagnosed with listeriosis but their newborn infants tested positive. The symptomatic maternal case with multiple gestation affected only one of the twins.
- Maternal ages ranged from 20 to 41 years with a median of 34 years.
- The number of perinatal listeriosis cases in 2014 is consistent that of the past ten years, except for a greater number of cases in 2006 (Figure 1).
- Hispanic women had the highest number of cases of perinatal listeriosis, consistent across the past five years with the exception of 2012, when non-Hispanic white mothers comprised the majority of cases (Figure 2). Incidence of perinatal listeriosis remains consistent among Hispanic mothers. There have been no cases of perinatal listeriosis reported in black expectant mothers since 2006.
- Three of the mothers reported eating Mexican cheese, two reported pre-packaged

cold cuts and deli salads, and one had pre-prepared dips while pregnant.

- All five mothers were hospitalized and released. There were no maternal deaths.

d Perinatal Listeriosis Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2010-2014

10 (N=4)		2011 (N=6)			2012 (N=7)			2013 (N=4)			2014 (N=5)		
(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
-	-	0	-	-	0	-	-	0	-	-	0	-	-
-	-	0	-	-	0	-	-	0	-	-	0	-	-
-	-	0	-	-	0	-	-	0	-	-	0	-	-
75.0	0.1	3	50.0	-	4	57.0	-	4	100.	4.3	4	80.0	0.1
25.0	0.1	3	50.0	-	3	42.9	-	0	-	-	1	20.0	0.1
-	-	0	-	-	0	-	-	0	-	-	0	-	-
-	-	0	-	-	0	-	-	0	-	-	0	-	-
-	-	0	-	-	0	-	-	0	-	-	0	-	-
-	-	0	-	-	0	-	-	0	-	-	0	-	-
25.0	0.1	2	33.3		1	14.3	-	0	-	-	2	40.0	0.2
-	-	0	-	-	0	-	-	0	-	-	0	-	-
50.0	-	5	50.0	-	2	28.6	-	3	75.0	4.4	3	60.0	0.1
25.0	-	1	16.7	-	4	57.1	-	1	25.1	4.5	0	-	-
-	-	0	-	-	0	-	-	0	-	-	0	-	-
-	-	0	-	-	0	-	-	0	-	-	0	-	-
-	-	0	-	-	0	-	-	0	-	-	0	-	-
50.0	0.1	0	-	-	2	28.6	-	1	25.0	0.2	1	20.0	0.2
-	-	3	50.0	-	2	28.6	-	1	25.0	0.3	1	20.0	0.3
-	-	0	-	-	1	14.3	-	0	-	-	1	20.0	0.4
-	-	0	-	-	0	-	-	0	-	-	0	-	-
25.0	0.1	1	16.7		0	-	-	0	-	-	1	20.0	0.5
25.0	0.1	0	-	-	1	14.3	-	1	25.0	0.3	0	-	-
-	-	2	33.3	-	1	14.3	-	1	25.0	0.4	1	20.0	0.5
-	-	0	-	-	0	-	-	0	-	-	0	-	-

n less than 19 cases or events are considered unreliable.

Figure 1. Reported Cases of Perinatal Listeriosis LAC, 2005-2014

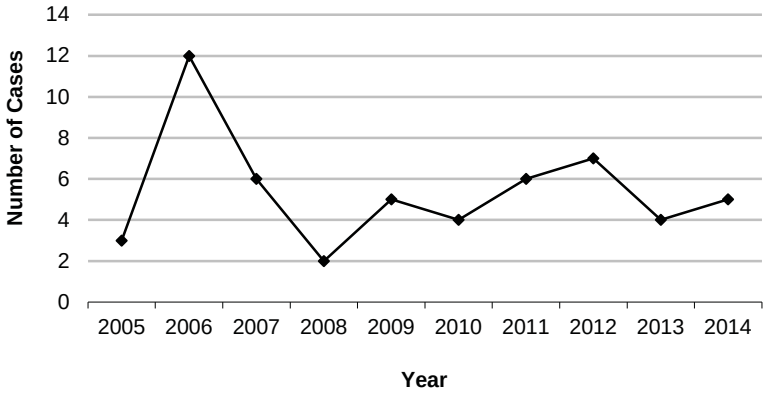


Figure 2. Perinatal Listeriosis Cases by LAC, 2010-2014

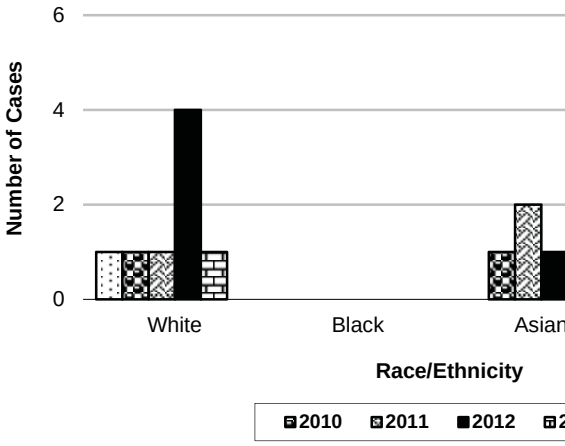
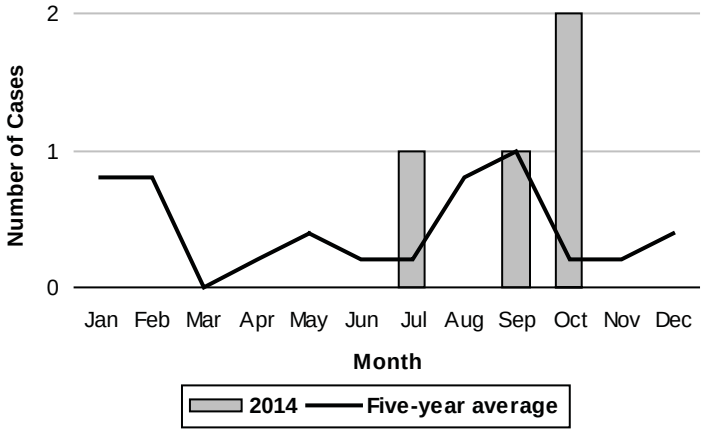


Figure 3. Reported Perinatal Listeriosis Cases by Month of Onset, LAC, 2014 (N=5)



LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases	4
Annual Incidence[a]	
LA County[b]	3.34
California	N/A
United States	N/A
Age at Diagnosis	
Mean	26
Median	28
Range	15-32

[a]Cases per 100,000 live births.
[b]Rates calculated based on less than 19 cases or events are considered unreliable.

DESCRIPTION

Listeriosis is a disease caused by infection with *Listeria monocytogenes*, a Gram-positive rod that is found in soil throughout the environment. Listeriosis is often caused by ingestion of foods contaminated with *L. monocytogenes.* Foods often associated with *Listeria* contamination include raw fruits and vegetables; undercooked meat, such as beef, pork, poultry, and pâté; cold cuts from deli counters; and unpasteurized dairy products—milk, milk products and soft cheeses (Mexican-style, Brie, feta, blue-veined, Camembert).

Pregnant women are susceptible because pregnancy causes a suppression of the immune system. The pregnant mother may only experience a mild febrile illness, but can transmit the infection to the fetus. Symptoms of listeriosis include: fever, muscle aches, and sometimes nausea or diarrhea. If infection spreads to the nervous system, symptoms such as headache, stiff neck, confusion, loss of balance, or convulsions can occur. Infections during pregnancy can lead to miscarriage, stillbirth, premature delivery, or infection of the newborn. Often *Listeria* can be isolated from both the mother and the infant.

Pregnant women should avoid foods associated with *Listeria*, particularly cheeses sold by street vendors or obtained from relatives/friends in other countries, where food processing quality assurance is unknown.

Additionally fruits and vegetables should be thoroughly washed. Uncooked meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating.

Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, it is recommended that pregnant women avoid these foods or thoroughly heat cold cuts before eating.

Prevention strategies for healthcare providers include education during prenatal checkups, outreach to Latino communities, and food safety notices at food and deli markets.

2013 TRENDS AND HIGHLIGHTS

- In 2013, there were four cases of perinatal listeriosis. Three cases were Hispanic expectant mothers; one case was white non-Hispanic. All of the cases were single gestations. Three of the babies were born with signs of sepsis and were blood culture positive, with one neonatal fatality.
- Maternal ages ranged from 15 to 32 years.
- The number of perinatal listeriosis cases in 2013 is consistent with the range of incidence of listeriosis over the past ten years, excluding an increase in 2006 (Figure 1).
- Hispanic women had the highest number of cases of perinatal listeriosis unlike previous years; non-Hispanic white mothers comprised the majority of cases in 2012, exceeding numbers seen in the past 5 years (Figure 2). Incidence of perinatal listeriosis remains consistent among Hispanic mothers. There have been no cases of perinatal listeriosis in black expectant mothers since 2006.
- None of the mothers reported eating fresh raw milk (unpasteurized, Mexican style) cheese while pregnant.

Reported Perinatal Listeriosis Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2009-2013

	2009 (N=5)			2010 (N=4)			2011 (N=6)			2012 (N=7)			2013 (N=4)		
	No.	(%)	Rate*/ 100,000	No.	(%)	Rate*/ 100,000	No.	(%)	Rate*/ 100,000	No.	(%)	Rate*/ 100,000	No.	(%)	Rate*/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
1-4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
5-14	0	0.0	0.0	0	0.0	00.	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
15-34	4	80.0	0.1	3	75.0	0.1	3	50.0		4	57.0		4	100.0	4.3
35-44	1	20.0	0.1	1	25.0	0.1	3	50.0		3	42.9		0	0.0	0.0
45-54	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
55-64	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
65+	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Race/Ethnicity															
Asian	2	40.0	0.2	1	25.0	0.1	2	33.3		0	14.3		0	0.0	0.0
Black	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Hispanic	3	60.0	0.1	2	50.0	0.0	5	50.0		2	28.6		3	75.0	4.4
White	0	0.0	0.0	1	25.0	0.0	1	16.7		4	57.1		1	25.1	4.5
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
SPA															
1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
2	0	0.0	0.0	2	50.0	0.1	0	0.0	0.0	2	28.6		1	25.0	0.2
3	0	0.0	0.0	0	0.0	0.0	3	50.0		2	28.6		1	25.0	0.3
4	2	40.0	0.2	0	0.0	0.0	0	0.0	0.0	1	14.3		0	0.0	0.0
5	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
6	1	20.0	0.1	1	25.0	0.1	1	16.7		0	0.0	0.0	0	0.0	0.0
7	0	0.0	0.0	1	25.0	0.1	0	0.0	0.0	1	14.3		1	25.0	0.3
8	2	40.0	0.2	0	0.0	0.0	2	33.3		1	14.3		1	25.0	0.4
Unknown	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0

*Rates calculated based on less than 19 cases or events are considered unreliable.

Figure 1. Reported Cases of Perinatal Listeriosis LAC, 2003-2013

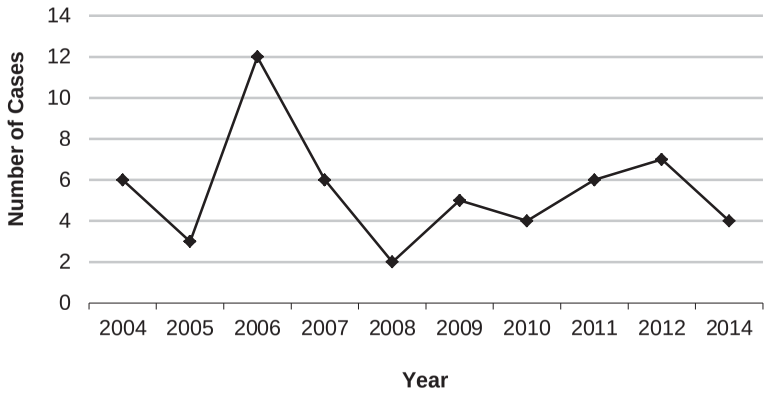


Figure 2. Perinatal Listeriosis Cases by Race/Ethnicity LAC, 2009-2013

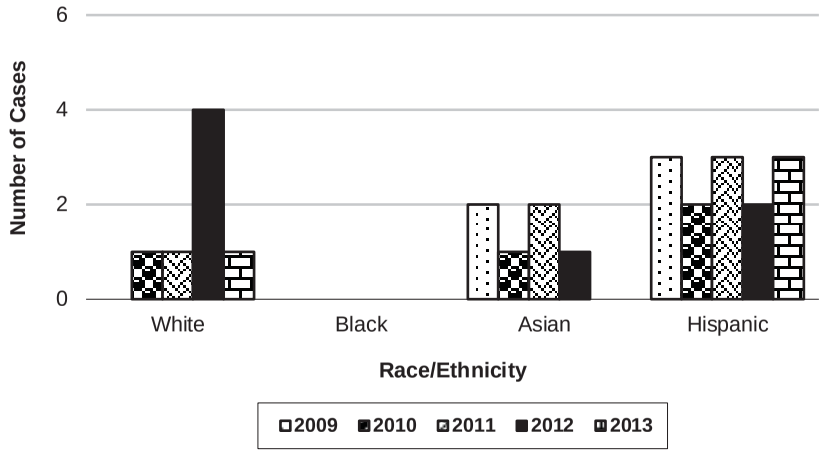
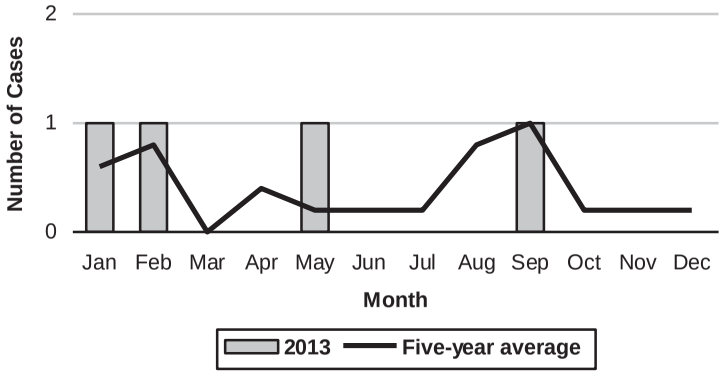


Figure 3. Reported Perinatal Listeriosis Cases by Month of Onset, LAC, 2013 (N=4)



LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases	7
Annual Incidence[a]	
LA County[b]	5.71
California[c]	N/A
United States[d]	0.013
Age at Diagnosis	
Mean	31
Median	32
Range	18-41

[a]Cases per 100,000 live births.
[b]Rates calculated based on less than 19 cases or events are considered unreliable.
[c] California combines non-perinatal and perinatal cases, thus making non-comparable rates.
[d]Based on 2011 CDC Listeria Initiative data and 2010 US census data.

DESCRIPTION

Listeriosis is a disease caused by infection with *Listeria monocytogenes*, a Gram-positive rod that is found in soil throughout the environment. Listeriosis is often caused by ingestion of foods contaminated with *L. monocytogenes.* Foods often associated with *Listeria* contamination include raw fruits and vegetables; undercooked meat, such as beef, pork, poultry, and pâté; cold cuts from deli counters; and unpasteurized dairy products—milk, milk products and soft cheeses (Mexican-style, Brie, feta, blue-veined, Camembert).

The disease affects primarily persons of advanced age, pregnant women, newborns, and adults with weakened immune systems. On rare occasions, people without these risk factors have also contracted listeriosis. Symptoms of listeriosis include: fever, muscle aches, and sometimes nausea or diarrhea. If infection spreads to the nervous system, symptoms such as headache, stiff neck, confusion, loss of balance, or convulsions can occur. Infected pregnant women may experience only a mild, flu-like illness; however, infections during pregnancy can lead to miscarriage, stillbirth, premature delivery, or infection of the newborn.

Pregnant women should avoid foods associated with *Listeria*, particularly cheeses sold by street vendors or obtained from relatives/friends in other countries, where food processing quality assurance is unknown.

Additionally fruits and vegetables should be thoroughly washed. Uncooked meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating.

Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, it is recommended that pregnant women avoid these foods or thoroughly heat cold cuts before eating.

Prevention strategies for healthcare providers include education during prenatal checkups, outreach to Latino communities, and food safety notices at food and deli markets.

2012 TRENDS AND HIGHLIGHTS

- In 2012, there were seven cases of perinatal listeriosis. Two cases were Hispanic expectant mothers; one case was Asian. There were four cases who were white non-Hispanic. All of the cases were single gestations. Six of the babies were born sick, with one neonatal fatality. One baby was treated at 35 weeks gestation and delivered at full term alive and well.
- Maternal ages ranged from 18 to 41 years.
- The number of perinatal listeriosis cases in 2012 is consistent within the range of incidence of listeriosis over the past ten years, excluding an aberrant increase in 2006 (Figure 1).
- Unlike previous years, non-Hispanic white mothers comprised the majority of cases of non-perinatal listeriosis in 2012, exceeding numbers seen in the past 5 years (Figure 2). Incidence of perinatal listeriosis remains consistent among Hispanic mothers. There have been no cases of perinatal listeriosis in black expectant mothers since 2006.
- None of the mothers reported eating fresh raw milk (unpasteurized, Mexican style) cheeses while pregnant. However one

mother ate pasteurized salted ricotta cheese that had been implicated in a listeriosis outbreak. She delivered a baby boy at 27 weeks, but the baby died four days after he was born. Her *Listeria* isolate was indistinguishable by PFGE from the *Listeria* isolated from the ricotta cheese.

Reported Perinatal Listeriosis Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2008-2012

	2008 (N=2)			2009 (N=5)			2010 (N=4)			2011 (N=6)			2012 (N=7)		
	No.	(%)	Rate*/ 100,000	No.	(%)	Rate*/ 100,000	No.	(%)	Rate*/ 100,000	No.	(%)	Rate*/ 100,000	No.	(%)	Rate*/ 100,000
Age Group															
<1	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
1-4	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
5-14	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
15-34	2	100		4	80.0		3	75.0		3	50.0		4	57.1	
35-44	0	0.0		1	20.0		1	25.0		3	50.0		3	42.9	
45-54	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
55-64	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
65+	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
Race/Ethnicity															
Asian	0	0.0		2	40.0		1	25.0		2	33.3		1	14.3	
Black	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
Hispanic	2	100		3	60.0		2	50.0		3	50.0		2	28.6	
White	0	0.0		0	0.0		1	25.0		1	16.7		4	57.1	
Other	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
SPA															
1	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
2	0	0.0		0	0.0		2	0.0		0	0.0		2	28.6	
3	1	50.0		0	0.0		0	0.0		3	50.0		2	28.6	
4	0	0.0		2	40.0		0	0.0		0	0.0		1	14.3	
5	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
6	0	0.0		1	20.0		1	25.0		1	16.7		0	0.0	
7	1	50.0		0	0.0		1	25.0		0	0.0		1	14.3	
8	0	0.0		2	40.0		0	0.0		2	33.3		1	14.3	
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	

*Rates calculated based on less than 19 cases or events are considered unreliable.

Figure 1. Reported Cases of Perinatal Listeriosis LAC, 2003-2012

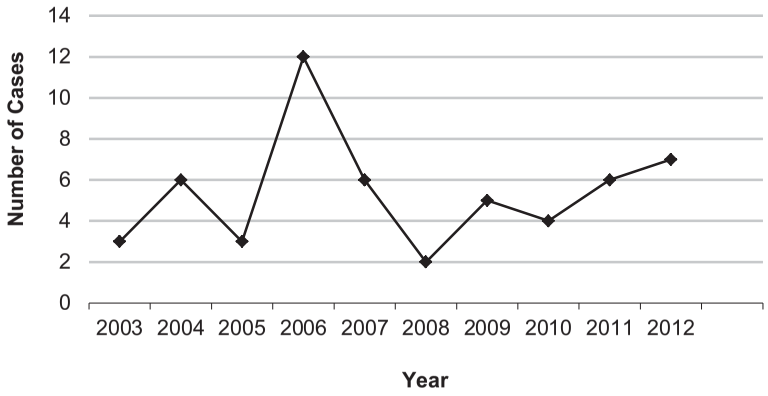


Figure 2. Perinatal Listeriosis Cases by Race/Ethnicity LAC, 2008-2012

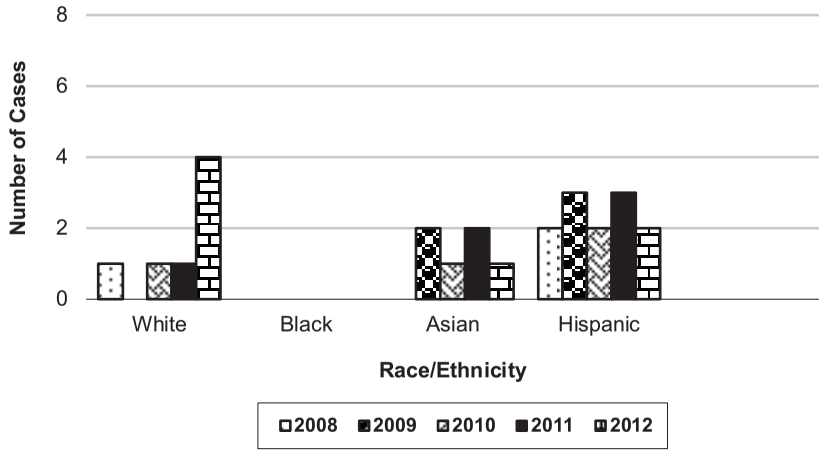
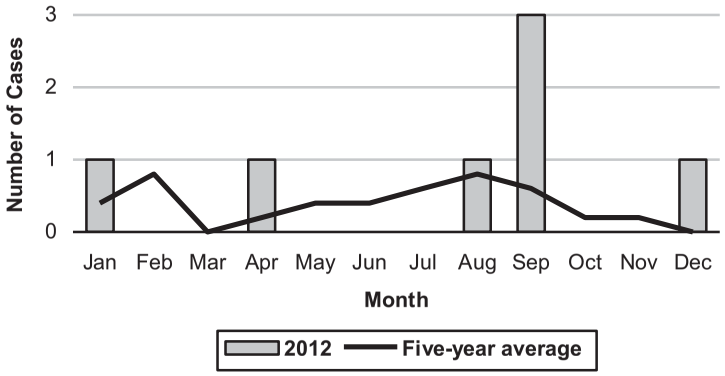


Figure 3. Reported Perinatal Listeriosis Cases by Month of Onset, LAC, 2012 (N=7)



LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases	4
Annual Incidence[a]	
LA County[b]	3.23
California[c]	N/A
United States[c]	N/A
Age at Diagnosis	
Mean	27
Median	30
Range	26 - 38

[a]Cases per 100,000 live births.
[b]Rates calculated based on less than 19 cases or events are considered unreliable.
[c] California and US combine non-perinatal and perinatal cases, thus making non-comparable rates.

DESCRIPTION

Listeriosis is a disease caused by infection with *Listeria monocytogenes*, a Gram-positive rod that is found in soil throughout the environment. Listeriosis is often caused by ingestion of foods contaminated with *L. monocytogenes.* Foods often associated with *Listeria* contamination include raw fruits and vegetables; undercooked meat, such as beef, pork, poultry, and pâté; cold cuts from deli counters; and unpasteurized dairy products—milk, milk products and soft cheeses (Mexican-style, Brie, feta, blue-veined, Camembert).

The disease affects primarily persons of advanced age, pregnant women, newborns, and adults with weakened immune systems. On rare occasions, people without these risk factors have also contracted listeriosis. Symptoms of listeriosis include: fever, muscle aches, and sometimes nausea or diarrhea. If infection spreads to the nervous system, symptoms such as headache, stiff neck, confusion, loss of balance, or convulsions can occur. Infected pregnant women may experience only a mild, flu-like illness; however, infections during pregnancy can lead to miscarriage, stillbirth, premature delivery, or infection of the newborn.

Pregnant women should avoid foods associated with *Listeria*, particularly cheeses sold by street vendors or obtained from relatives/friends in other countries, where food processing quality assurance is unknown.

Additionally fruits and vegetables should be thoroughly washed. Uncooked meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating.

Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, it is recommended that pregnant women avoid these foods or thoroughly heat cold cuts before eating.

Prevention strategies for healthcare providers include education during prenatal checkups, outreach to Hispanic communities, and food safety notices at food and deli markets.

2010 TRENDS AND HIGHLIGHTS

- In 2010, there were four cases of perinatal listeriosis. Two cases were Hispanic expectant mothers; the other two cases were Asian and white, respectively. All of the cases were single gestations. Two of the babies were born sick, but none died.
- Maternal ages ranged from 26 to 38 years.
- The number of perinatal listeriosis cases in 2010 is consistent within the range of incidence of listeriosis over the past ten years, excluding an aberrant increase in 2006 (Figure 1).
- Hispanic women had the highest number of cases of perinatal listeriosis as in previous years (Figure 2). There have been no cases of perinatal listeriosis in black expectant mothers since 2006.
- One mother reported eating “natural” (unpasteurized, Mexican style) cheese while pregnant.

Reported Perinatal Listeriosis Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2006-2010

	2006 (N=12)			2007 (N=6)			2008 (N=2)			2009 (N=5)			2010 (N=4)		
	No.	(%)	Rate*/ 100,000	No.	(%)	Rate*/ 100,000	No.	(%)	Rate*/ 100,000	No.	(%)	Rate*/ 100,000	No.	(%)	Rate*/ 100,000
Age Group															
<1	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
1-4	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
5-14	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
15-34	8	66.7		5	83.3		2	100.		4	80.0		3	75.0	
35-44	3	25.0		1	16.7		0	0.0		1	20.0		1	25.0	
45-54	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
55-64	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
65+	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
Unknown	1	8.3		0	0.0		0	0.0		0	0.0		0	0.0	
Race/Ethnicity															
Asian	1	8.3		0	0.0		0	0.0		2	40.0		1	25.0	
Black	3	25.0		0	0.0		0	0.0		0	0.0		0	0.0	
Hispanic	7	58.3		5	83.3		2	100.		3	60.0		2	50.0	
White	1	8.3		1	16.7		0	0.0		0	0.0		1	25.0	
Other	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
SPA															
1	1	8.3		0	0.0		0	0.0		0	0.0		0	0.0	
2	1	8.3		1	16.7		0	0.0		0	0.0		2	50.0	
3	2	16.7		0	0.0		1	50.0		0	0.0		0	0.0	
4	3	25.0		2	33.3		0	0.0		2	40.0		0	0.0	
5	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
6	2	16.7		1	16.7		0	0.0		1	20.0		1	25.0	
7	2	16.7		1	16.7		1	50.0		0	0.0		1	25.0	
8	1	8.3		1	16.7		0	0.0		2	40.0		0	0.0	
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	

*Rates calculated based on less than 19 cases or events are considered unreliable.

Figure 1. Reported Cases of Perinatal Listeriosis LAC, 2001-2010

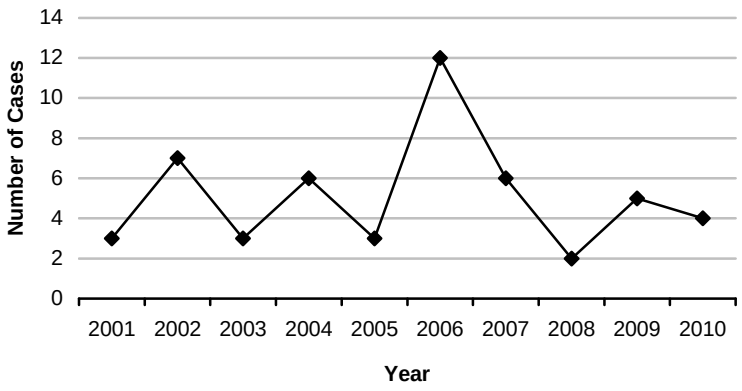


Figure 2. Perinatal Listeriosis Cases by Race/Ethnicity LAC, 2006-2010

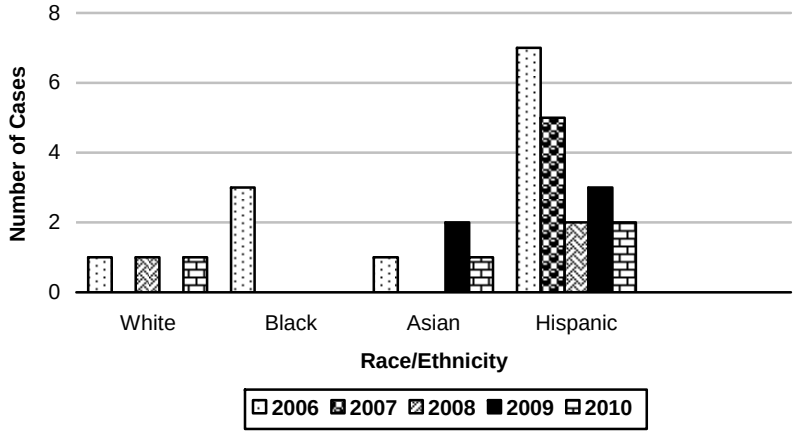
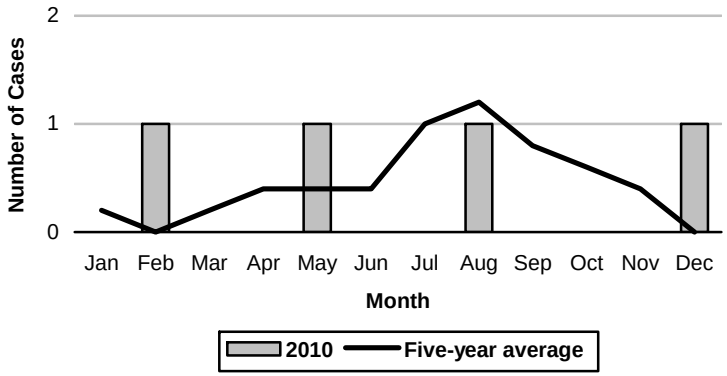


Figure 3. Reported Perinatal Listeriosis Cases by Month of Onset, LAC, 2010 (N=4)



LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases	5
Annual Incidence[a]	
LA County	4.6 [b]
California	N/A
United States	N/A
Age at Diagnosis	
Mean	30
Median	30
Range	23 - 35

[a]Cases per 100,000 live births.
[b]Rates calculated based on less than 19 cases or events are considered unreliable.

DESCRIPTION

Listeriosis is a disease caused by infection with *Listeria monocytogenes*, a Gram-positive rod that is found in soil throughout the environment. Listeriosis is often caused by ingestion of foods contaminated with *L. monocytogenes.* Foods often associated with *Listeria* contamination include raw fruits and vegetables; undercooked meat, such as beef, pork, poultry, and pâté; cold cuts from deli counters; and unpasteurized dairy products—milk, milk products and soft cheeses (Mexican-style, Brie, feta, blue-veined, Camembert).

The disease affects primarily persons of advanced age, pregnant women, newborns, and adults with weakened immune systems. On rare occasions, people without these risk factors have also contracted listeriosis. Symptoms of listeriosis include: fever, muscle aches, and sometimes nausea or diarrhea. If infection spreads to the nervous system, symptoms such as headache, stiff neck, confusion, loss of balance, or convulsions can occur. Infected pregnant women may experience only a mild, flu-like illness; however, infections during pregnancy can lead to miscarriage, stillbirth, premature delivery, or infection of the newborn.

Pregnant women should avoid foods associated with *Listeria*, particularly cheeses sold by street vendors or obtained from relatives/friends in other countries, where food processing quality assurance is unknown.

Additionally fruits and vegetables should be thoroughly washed. Uncooked meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating.

Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, it is recommended that pregnant women avoid these foods or thoroughly reheat cold cuts before eating.

Prevention strategies for healthcare providers include education during prenatal checkups, outreach to Hispanic communities, and food safety notices at food and deli markets.

2009 TRENDS AND HIGHLIGHTS

- In 2009, there were five cases of perinatal listeriosis. Two cases were Asian expectant mothers, and three cases were Hispanic expectant mothers. Two cases were pregnant with twins. One case ended with a stillbirth.
- Maternal ages ranged from 23 to 35 years.
- The number of perinatal listeriosis cases in 2009 is consistent within the range of incidence of listeriosis over the past ten years, excluding an aberrant increase in 2006 (Figure 1).
- Hispanic women had the highest number of cases of perinatal listeriosis as previous years, however, 2009 is remarkable for the relatively high proportion of cases among Asian expectant mothers (Figure 2).

Reported Perinatal Listeriosis Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2005-2009

	2005 (N=3)			2006 (N=12)			2007 (N=6)			2008 (N=2)			2009 (N=5)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
1-4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
5-14	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
15-34	2	66.7	0.1	8	66.7	0.3	5	83.3	0.2	2	100.	0.1	4	80.0	3.8
35-44	1	33.3	0.1	3	25.0	0.2	1	16.7	0.1	0	0.0	0.0	1	20.0	4.0
45-54	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
55-64	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
65+	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	0	0.0		1	8.3		0	0.0		0	0.0		0	0.0	0.0
Race / Ethnicity															
Asian	0	0.0	0.0	1	8.3	0.1	0	0.0	0.0	0	0.0	0.0	2	40.0	13.2
Black	0	0.0	0.0	3	25.0	0.4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Hispanic	2	66.7	0.0	7	58.3	0.2	5	83.3	0.1	2	100.	0.0	3	60.0	3.7
White	1	33.3	0.0	1	8.3	0.0	1	16.7	0.0	0	0.0	0.0	0	0.0	0.0
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	0.0
SPA															
1	0	0.0	0.0	1	8.3	0.3	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
2	0	0.0	0.0	1	8.3	0.0	1	16.7	0.0	0	0.0	0.0	0	0.0	0.0
3	0	0.0	0.0	2	16.7	0.1	0	0.0	0.0	1	50.0	0.1	0	0.0	0.0
4	1	33.3	0.1	3	25.0	0.2	2	33.3	0.2	0	0.0	0.0	2	40.0	0.7
5	1	33.3	0.2	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
6	1	33.3	0.1	2	16.7	0.2	1	16.7	0.1	0	0.0	0.0	1	20.0	0.4
7	0	0.0	0.0	2	16.7	0.1	1	16.7	0.1	1	50.0	0.1	0	0.0	0.0
8	0	0.0	0.0	1	8.3	0.1	1	16.7	0.1	0	0.0	0.0	2	40.0	0.8
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	0.0

*Rates calculated based on less than 19 cases or events are considered unreliable.

Figure 1. Reported Cases of Perinatal Listeriosis LAC, 1999-2009

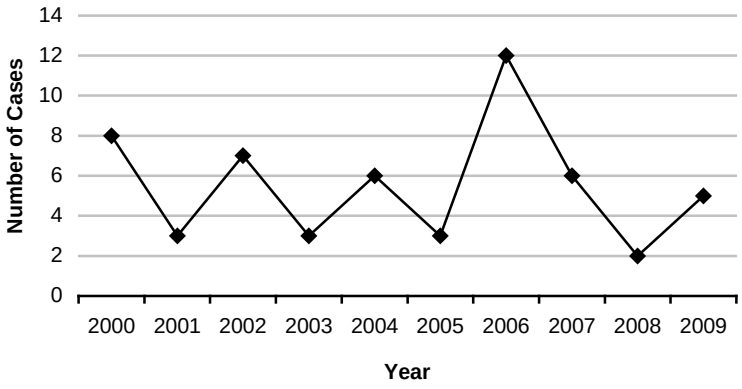


Figure 2. Perinatal Listeriosis Incidence by Race/Ethnicity LAC, 2005-2009

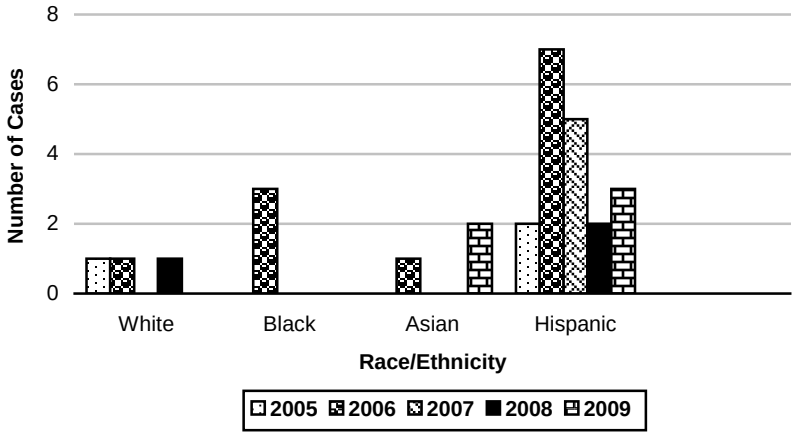
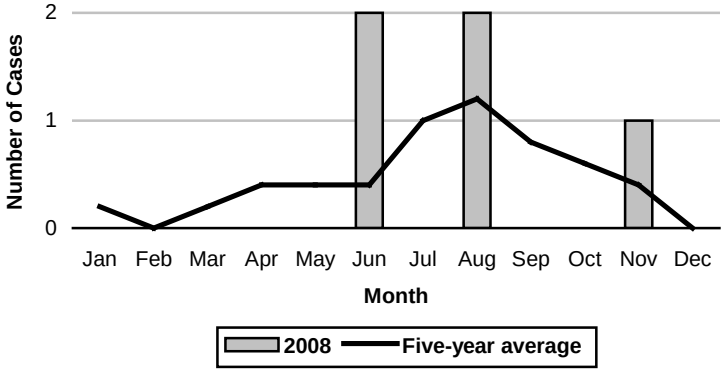


Figure 3. Reported Perinatal Listeriosis Cases by Month of Onset, LAC, 2009 (N=5)



LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases	2
Annual Incidence[a]	
LA County [b]	1.45
California	N/A
United States	N/A
Age at Diagnosis	
Mean	28
Median	28
Range	27 - 29

[a]Cases per 100,000 live births.
[b]Rates calculated based on less than 19 cases or events are considered unreliable.

DESCRIPTION

Listeriosis is a disease caused by infection with *Listeria monocytogenes*, a Gram-positive rod that is found in soil throughout the environment. Listeriosis is often caused by ingestion of foods contaminated with *L. monocytogenes.* Foods often associated with *Listeria* contamination include raw fruits and vegetables; undercooked meat, such as beef, pork, poultry, and pâté; and cold cuts from deli counters; and unpasteurized dairy products—milk, milk products and soft cheeses (Mexican-style, Brie, feta, blue-veined, Camembert). The disease affects primarily persons of advanced age, pregnant women, newborns, and adults with weakened immune systems. On rare occasions, people without these risk factors have also contracted listeriosis. Symptoms of listeriosis include: fever, muscle aches, and sometimes nausea or diarrhea. If infection spreads to the nervous system, symptoms such as headache, stiff neck, confusion, loss of balance, or convulsions can occur. Infected pregnant women may experience only a mild, flu-like illness; however, infections during pregnancy can lead to miscarriage or stillbirth, premature delivery, or infection of the newborn.

Pregnant women should avoid foods associated with *Listeria*. In particular, cheese sold by street vendors or obtained from relatives/friends in other countries, where food processing quality assurance is unknown, should be avoided by pregnant women.

In addition, fruits and vegetables should be thoroughly washed. Uncooked meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating. Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, pregnant women may choose to avoid these foods or thoroughly reheat cold cuts before eating. Prevention strategies for healthcare providers include education during prenatal checkups, outreach to Hispanic communities, and food safety notices at food and deli markets.

2008 TRENDS AND HIGHLIGHTS

- In 2008 there were two cases of perinatal listeriosis, both occurring among Hispanic women who delivered prematurely. One woman delivered fraternal twins, but one of the infants died of infection. The other woman delivered a baby boy who survived, but was very ill at birth.
- The two women are in the age group 15-34 years and reside in Service Planning Area 3 and 7.
- The number of perinatal listeriosis cases in 2008 is consistent with a downward trend in incidence of listeriosis overall (Figure 1).
- Hispanic women are at greatest risk of developing perinatal listeriosis (Figure 2).

Reported Perinatal Listeriosis Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2004-2008

	2004 (N=6)			2005 (N=3)			2006 (N=12)			2007 (N=6)			2008 (N=2)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
1-4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
5-14	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
15-34	5	83.3	0.2	2	66.7	0.1	8	66.7	0.3	5	83.3	0.2	2	100.0	0.1
35-44	1	16.7	0.1	1	33.3	0.1	3	25.0	0.2	1	16.7	0.1	0	0.0	0.0
45-54	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
55-64	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
65+	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	0	0.0		0	0.0		1	8.3		0	0.0		0	0.0	
Race / Ethnicity															
Asian	0	0.0	0.0	0	0.0	0.0	1	8.3	0.1	0	0.0	0.0	0	0.0	0.0
Black	0	0.0	0.0	0	0.0	0.0	3	25.0	0.4	0	0.0	0.0	0	0.0	0.0
Hispanic	4	66.7	0.1	2	66.7	0.0	7	58.3	0.2	5	83.3	0.1	2	100.0	0.0
White	2	33.3	0.1	1	33.3	0.0	1	8.3	0.0	1	16.7	0.0	0	0.0	0.0
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
SPA															
1	0	0.0	0.0	0	0.0	0.0	1	8.3	0.3	0	0.0	0.0	0	0.0	0.0
2	2	33.3	0.1	0	0.0	0.0	1	8.3	0.0	1	16.7	0.0	0	0.0	0.0
3	0	0.0	0.0	0	0.0	0.0	2	16.7	0.1	0	0.0	0.0	1	50.0	0.1
4	0	0.0	0.0	1	33.3	0.1	3	25.0	0.2	2	33.3	0.2	0	0.0	0.0
5	2	33.3	0.3	1	33.3	0.2	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
6	0	0.0	0.0	1	33.3	0.1	2	16.7	0.2	1	16.7	0.1	0	0.0	0.0
7	2	33.3	0.1	0	0.0	0.0	2	16.7	0.1	1	16.7	0.1	1	50.0	0.1
8	0	0.0	0.0	0	0.0	0.0	1	8.3	0.1	1	16.7	0.1	0	0.0	0.0
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	

*Rates calculated based on less than 19 cases or events are considered unreliable.

Figure 1. Reported Cases of Perinatal Listeriosis LAC, 1999-2008

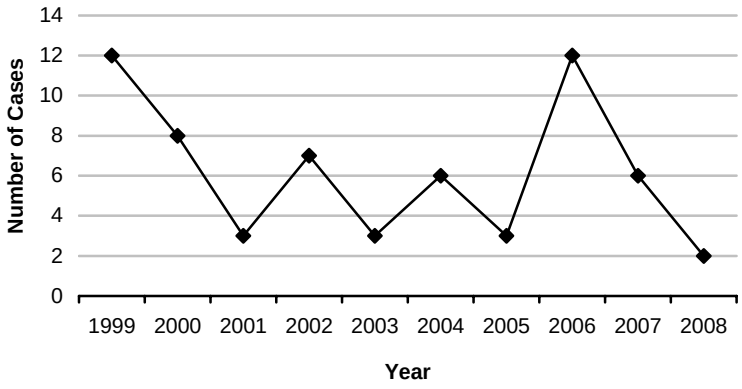


Figure 2. Perinatal Listeriosis Incidence by Race/Ethnicity LAC, 2004-2008

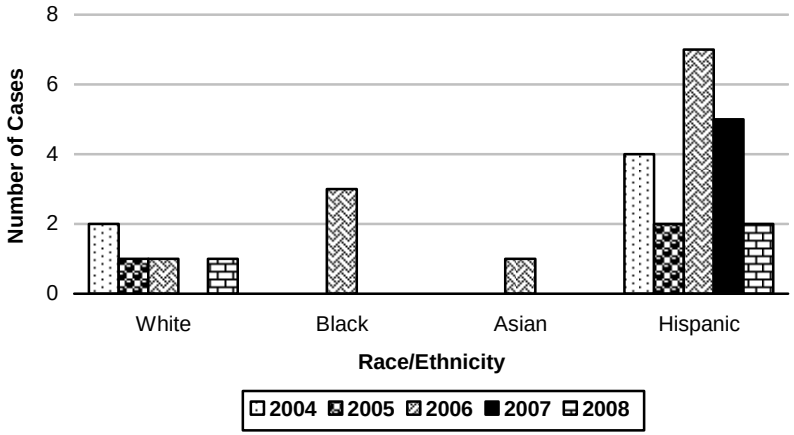
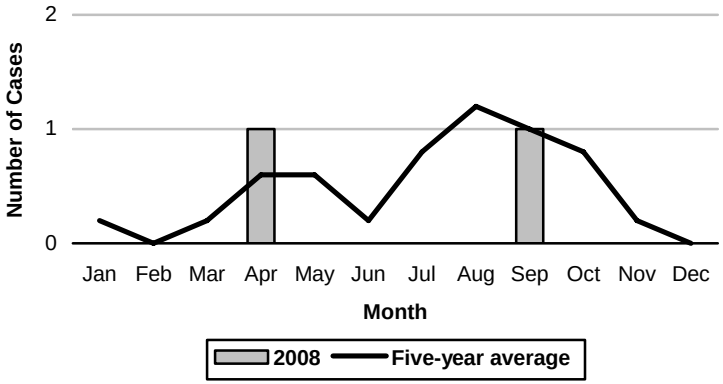


Figure 3. Reported Perinatal Listeriosis Cases by Month of Onset, LAC, 2008

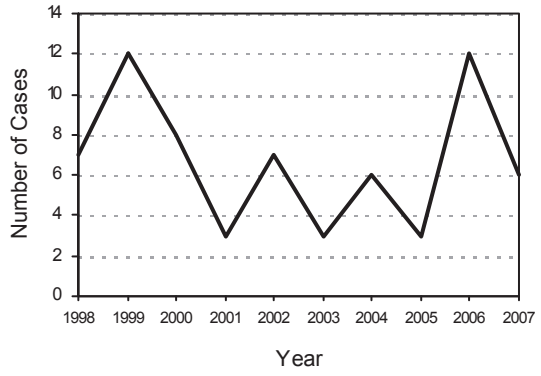


LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases[a]	6
Annual Incidence[b]	
LA County	4.23[c]
United States	N/A
Age at Onset	
Maternal:	
Mean	26.83 years
Median	26 years
Range	17-39 years
Infant Gestational:	
Mean	32.67 weeks
Median	33.5 weeks
Range	25-38 weeks

[a] Cases are mother-infant pairs.
[b] Rates for perinatal listeriosis were calculated as cases per 100,000 live births.
[c] Rates based on less than 19 observations are unreliable.

Figure 1
Perinatal Listeriosis
Cases by Year of Onset
LAC, 1998–2007



DESCRIPTION

Perinatal listeriosis is a disease transmitted transplacentally from infected pregnant women; these women may experience only mild flu-like symptoms or may be asymptomatic. A perinatal listeriosis case is defined as a mother-infant pair in which one or both persons has a positive *Listeria monocytogenes* culture from a normally sterile site. Neonatal/infant listeriosis is often categorized into early onset (0-6 days after birth) and late onset (7-42 days after birth). Infection during pregnancy may lead to premature birth, stillbirth, or septicemia and/or meningitis in the neonate—even if the mother is asymptomatic. There is no vaccine to prevent listeriosis.

DISEASE ABSTRACT

- Perinatal listeriosis declined from 12 cases in 2006 to six cases in 2007 (Figure 1). The six cases were all single births.
- The six cases were born ill at varying lengths of gestation ranging from 25 to 38 weeks. There were no cases of fetal demise associated with listeriosis during 2007.

STRATIFIED DATA

Trends: Since 2002, the number of perinatal listeriosis has fluctuated, ranging from 3 to 12 cases. This year there was a noticeable decline in the number of cases from 12 in 2006 to six in 2007 (Figure 1).

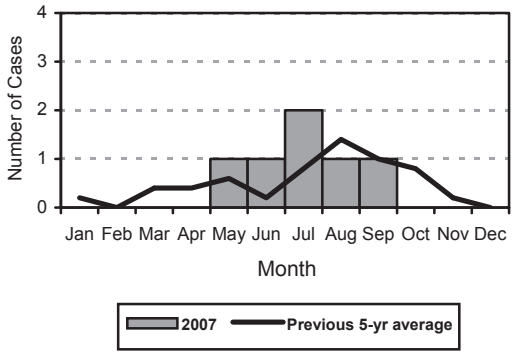
Seasonality: In 2007, the seasonality of perinatal listeriosis was slightly, though insignificantly, earlier than the average annual incidence of the previous five years. Perinatal listeriosis cases peaked in July during 2007 (Figure 2).

Age: During 2007, the average maternal age of perinatal cases at disease onset was slightly lower compared to those in 2006 although the overall five-year trend remains unchanged. The average gestational age of perinatal cases at disease onset was slightly higher than 2006.

Race/Ethnicity: In 2007, 83% (n=5) of the cases were Hispanic, which is noticeably higher than years past. There was a decrease in black cases from 3 cases in 2006 to 0 in 2007. The remaining case was white (n=1, 16.67%). However, due to small numbers of cases, it is difficult to draw conclusions from this information.

Type of Delivery: Four infants (67%) were delivered by caesarian section. The remaining two infants (33%) were delivered vaginally.

Figure 2
Perinatal Listeriosis
Cases by Month of Onset
LAC, 2007



Outcome: There were no maternal fatalities. All six infants were delivered sick at varying weeks of gestation ranging from 25-38 weeks. All of the infants recovered.

Culture Sites: Listeriosis was culture confirmed in one maternal and five neonatal isolates. Among culture-positive mothers, one (16.67%) mother had *L. monocytogenes* isolated from the placenta. Of the five neonatal isolates, all five had *L. monocytogenes* isolated from blood; one neonate had *L. monocytogenes* isolated from a wound culture as well.

Maternal Clinical Signs/Outcomes: In 2007, five mothers had fever (83%). Temperatures were recorded for five mothers with an average temperature of 101.4°F.

Onset: In 2007, six neonates/infants (100%) were categorized as early onset cases in which the disease onset is 0 to 6 days after birth.

High-risk Foods: Five cases (83%) reported eating at least one potentially high-risk food. Four ate Mexican-style cheese; the other risk foods included: soft cheeses (n=3), raw fruits (n=3), and cold cuts (n=3) (Table 1).

Risk factors: Three mothers (50%) had known predisposing medical risk factors other than pregnancy. Those factors included use of iron supplements and gestational diabetes.

PREVENTION

L. monocytogenes is found in soil and water. Animals can carry *Listeria* without appearing ill, which can result in contaminated foods of animal origin, such as meats and dairy products. In particular, studies have implicated unpasteurized milk or milk products; soft cheeses (Mexican-style, Brie, feta, blue-veined, Camembert); undercooked meat, such as beef, pork, poultry, and pâté; and cold cuts from deli counters. Pregnant women should avoid these foods. In particular, cheese sold by street vendors or obtained from relatives/friends in other countries, where food processing quality assurance is unknown, should be avoided by pregnant women. In addition, fruits and vegetables should be thoroughly washed. Uncooked

Table 1. High-risk Foods among Cases of Perinatal Listeriosis—LAC, 2007

Risk foods	Number	Percent
Mexican-style Cheese	4	67
Cold Cuts/Deli Meats	3	50
Raw Fruit	3	50
Soft Cheese	3	50
Raw Vegetables	2	33
Other Cheese	1	16
Raw Milk	0	0
Yeast Products	0	0

meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating. Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, pregnant women may choose to avoid these foods or thoroughly reheat cold cuts before eating.

Prevention strategies for healthcare providers include education during prenatal checkups, outreach to Hispanic communities, and food safety notices at food and deli markets.

COMMENTS

All isolates of *L. monocytogenes* are typed by pulsed-field gel electrophoresis (PFGE), a technique to detect matching strains of various pathogenic agents. When matches between isolates from patients or foods are detected, an investigation may be initiated. In addition, a solitary case occurring locally can be linked by PFGE results to an outbreak occurring on a wider geographical scale. In 2007, there were two cases that matched locally; however, further investigation failed to identify the source of the infections. There were no cases of *L. monocytogenes* in LAC associated with a multi-jurisdictional outbreak identified in this manner during 2007.

ADDITIONAL RESOURCES

General disease information—http://www.cdc.gov/nczved/dfbmd/disease_listing/listeriosis_gi.html

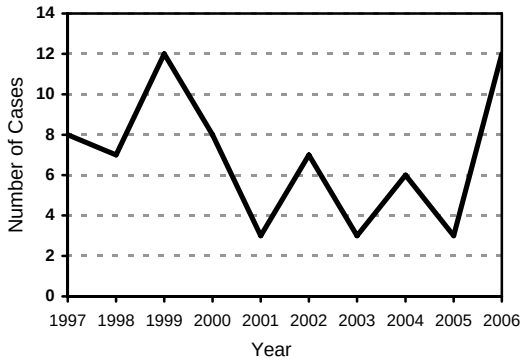
General information and reporting information about this and other foodborne diseases in LAC—
http://www.lapublichealth.org/acd/food.htm

LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases[a]	12
Annual Incidence[b] LA County United States	 8.47[c] N/A
Age at Onset Maternal: Mean Median Range Infant Gestational: Mean Median Range	 28.36 years 30 years 16-38 years 31 weeks 31 weeks 22-37 weeks

[a] Cases are mother-infant pairs.
[b] Rates for perinatal listeriosis were calculated as cases per 100,000 live births.
[c] Rates based on less than 19 observations are unreliable.

Figure 1
Perinatal Listeriosis
Cases by Year of Onset
LAC, 1997–2006



DESCRIPTION

Perinatal listeriosis is a disease transmitted transplacentally from infected pregnant women; these women may experience only mild flu-like symptoms or may be asymptomatic. A perinatal listeriosis case is defined as a mother-infant pair in which one or both persons has a positive *Listeria monocytogenes* culture from a normally sterile site. Neonatal/infant listeriosis is often categorized into early onset (0–6 days after birth) and late onset (7–42 days after birth). Infection during pregnancy may lead to premature birth, stillbirth, or septicemia and/or meningitis in the neonate—even if the mother is asymptomatic. There is no vaccine to prevent listeriosis.

DISEASE ABSTRACT

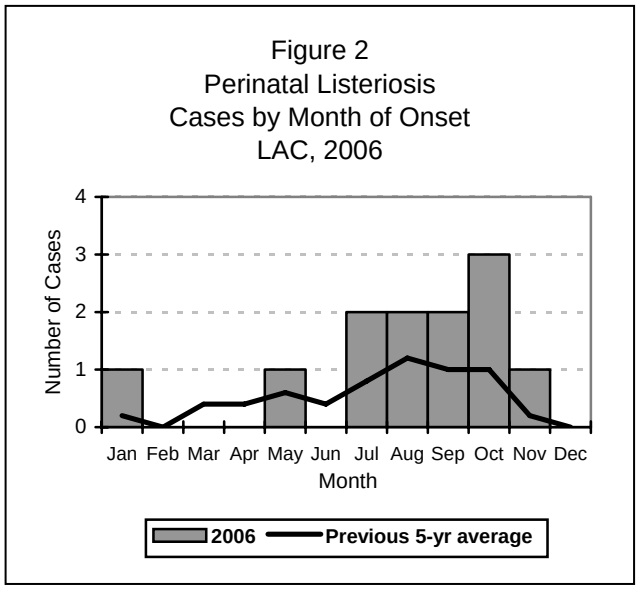
- Perinatal listeriosis increased markedly from three cases in 2005 to 12 cases in 2006 (Figure 1). The 12 cases included ten single births and one set of twins.

- Eight cases were born ill at varying lengths of gestation. Two cases resulted in fetal demise at 22 and 31 weeks gestation. The outcomes of the remaining two cases were unknown due to inability to contact the family for follow-up.

STRATIFIED DATA

Trends: Since 2001, the number of perinatal listeriosis has fluctuated, ranging from 3 to 12 cases, with a marked increase from three cases in 2005 to 12 cases in 2006 (Figure 1).

Seasonality: In 2006, the seasonality of perinatal listeriosis was slightly, though insignificantly, later than the average annual incidence of the previous five years. Perinatal listeriosis cases peaked in October during 2006 (Figure 2).



Age: During 2006, the average maternal and gestational ages of perinatal cases at disease onset (28 years and 31 weeks, respectively) were higher compared to those in 2005 although the overall five year trend remains unchanged.

Sex: In 2006, seven infants were identified as male and five as female. The male to female ratio was 1.4:1. In 2005 the male to female ratio was unknown. During 2004 and 2003, the male to female ratios were 2:3 and 2:1, respectively.

Race/Ethnicity: In 2006, 58.3% (n=7) of the cases were Latino, which is similar to years past. There was an increase in black cases from 0 cases in 2005 to 3 in 2006 (25%). The remaining cases were white (n=1, 8.3%) and Asian (n=1, 8.3%). However, due to small numbers of cases, it is difficult to draw conclusions from this information.

Location: In 2006, three cases resided in SPA 4 (Central and Northeast health districts), SPAs 3, 6 and 7 had two cases each. Additionally, one case resided in each of SPAs 1, 2 and 8. In 2005, reported perinatal cases were from only SPA 4 and 6.

Type of Delivery: Five infants (42%) were delivered by caesarian section. Two infants (17%) were delivered vaginally. The mode of delivery for the remaining infants is unknown.

Outcome: There were no maternal fatalities. Two (33%) neonates were stillborn – one at 22 and one at 31 weeks of gestation. Eight infants (67%) were delivered sick at varying weeks of gestation ranging from 25-37 weeks of gestation. The outcomes of the other two infants are unknown.

Culture Sites: Listeriosis was culture confirmed in six maternal and ten neonatal isolates. Among culture-positive mothers, five (83%) mothers had *L. monocytogenes* isolated from blood, one mother had *L. monocytogenes* isolated from peritoneal fluid. Of the ten neonatal isolates, six (60%) had *L. monocytogenes* isolated from blood; the other isolates were from wound, amniotic fluid, gastric aspirate and sputum.

Maternal Clinical Signs/Outcomes: In 2006, ten mothers had fever (91%). Temperatures were recorded for five mothers with an average temperature of 102°F. Signs and symptoms were unknown for one case. Similar to the previous three years no mothers had meningitis.

Onset: In 2006, 12 neonates/infants (100%) were categorized as early onset cases in which the disease onset is 0 to 6 days after birth.

High-risk Foods: Six cases (50%) reported eating at least one potentially high-risk food. All six ate Mexican-style cheese; the other risk foods included: soft cheeses (n=2), raw fruits (n=3) and raw vegetables (n=3) (Table 1).

Risk factors: Four mothers (36%) had known predisposing medical risk factors other than pregnancy. Those factors included use of iron supplements, chronic anemia, and gestational diabetes.

PREVENTION

L. monocytogenes is found in soil and water. Animals can carry *Listeria* without appearing ill, which can result in contaminated foods of animal origin, such as meats and dairy products. In particular, studies have implicated unpasteurized milk or milk products; soft cheeses (Mexican-style, Brie, Feta, blue-veined, Camembert); undercooked meat, such as beef, pork, poultry, and pâté; and cold cuts from deli counters. Pregnant women should avoid these foods. In particular, cheese sold by street vendors, or obtained from relatives/friends in other countries where food processing quality assurance is unknown should be avoided by pregnant women.

Table 1. High-risk Foods among Cases of Perinatal Listeriosis—LAC, 2006

Risk foods	Number	Percent
Mexican-style Cheese	6	50
Raw Fruit	3	25
Raw Vegetables	3	25
Soft Cheese	2	17
Other Cheese	0	0
Cold Cuts/ Deli Meats	0	0
Yeast Products	0	0
Raw Milk	0	0

In addition, fruits and vegetables should be thoroughly washed. Uncooked meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating. Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, pregnant women may choose to avoid these foods or thoroughly reheat cold cuts before eating.

Given the seasonality of perinatal listeriosis, prevention strategies should take effect before April. Possible preventive methods include education during prenatal checkups, outreach to Hispanic/Latino communities, and food safety notices at food and deli markets.

COMMENTS

Incidence of perinatal listeriosis in LAC increased to 12 cases in 2006. Prevention efforts should be targeted towards Hispanic and black women, especially since Hispanics are the fastest growing segment of the LAC population. There were no perinatal cases associated with outbreaks in 2006.

All isolates of *L. monocytogenes* are typed by pulsed-field gel electrophoresis (PFGE), a technique to detect matching strains of various pathogenic agents. When matches between isolates from patients or foods are detected, an investigation may be initiated. In addition, a solitary case occurring locally can be linked by PFGE results to an outbreak occurring on a wider geographical scale. In 2006, there were no cases of *L. monocytogenes* in LAC associated with a multi-jurisdictional outbreak identified in this manner.

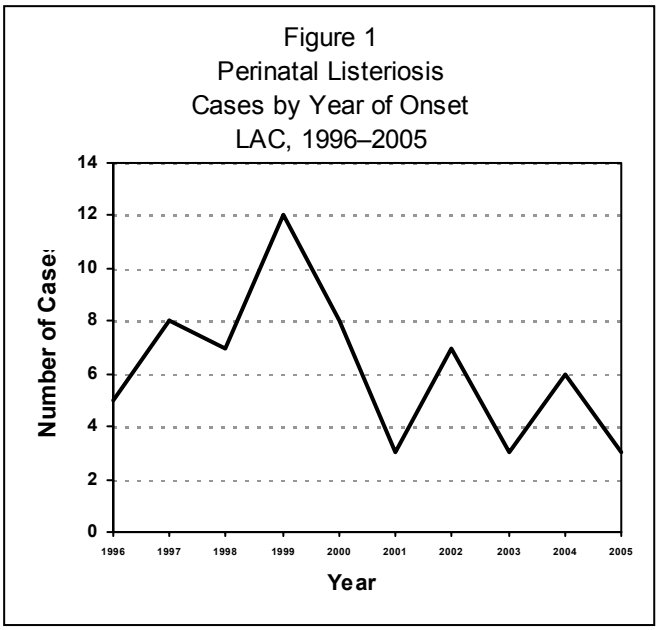
ADDITIONAL RESOURCES

General disease information is available from the CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/listeriosis_g.htm

General information and reporting information about this and other foodborne diseases in LAC is available at: www.lapublichealth.org/acd/food.htm

LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases [a]	3
Annual Incidence [b] LA County United States	 ---[c] N/A
Age at Onset Maternal: Mean Median Range Infant Gestational: Mean Median Range	 31.7 years 29 years 25-41 years 31 weeks 28.3 weeks 20-34 weeks
Case Fatality LA County United States	 33%[d] N/A



[a] Cases are mother-infant pairs.
[b] Cases per 100,000 population.
[c] Rates based on less than 20 observations are unreliable.
[d] Among fetal/neonate cases only, no maternal deaths included.

DESCRIPTION

Perinatal listeriosis is a disease transmitted transplacentally from infected pregnant women; these women may experience only mild flu-like symptoms or may be asymptomatic. A perinatal listeriosis case is defined as a mother-infant pair in which one or both persons has a positive *Listeria monocytogenes* culture from a normally sterile site. Neonatal/infant listeriosis is often divided into early onset (0–6 days after birth) and late onset (7–42 days after birth). Infection during pregnancy may lead to premature birth, stillbirth, or septicemia and/or meningitis in the neonate—even if the mother is asymptomatic. There is no vaccine to prevent listeriosis.

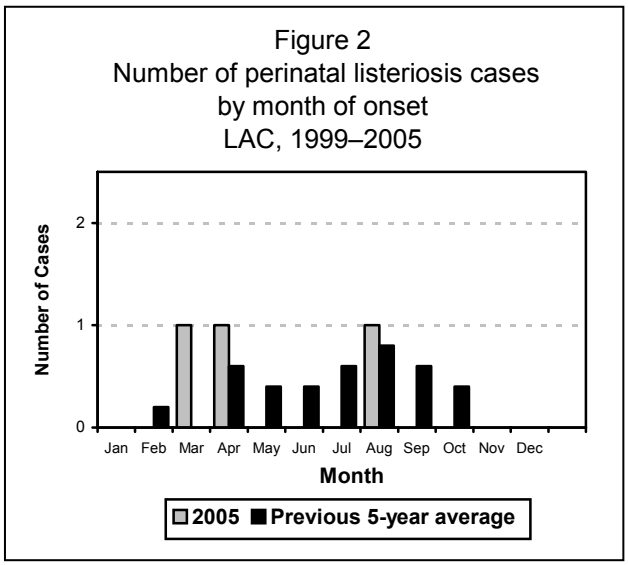
DISEASE ABSTRACT

- Perinatal listeriosis increased from three cases in 2003 to six cases in 2004, and then declined back to three cases in 2005 (Figure 1).
- One case ended with fetal demise at 20 weeks of gestation. One male infant was born ill at 34 weeks of gestation. One case was treated at 31 weeks of gestation and carried the pregnancy to term.

STRATIFIED DATA

Trends: Since 2002, the annual incidence of perinatal listeriosis has fluctuated, ranging from three to seven cases (Figure 1).

Seasonality: In 2005, the seasonality of perinatal listeriosis was slightly, though insignificantly, earlier than the average annual incidence of the previous five years; higher levels of incidence occurred between April and October, particularly in August (Figure 2).



Age: During 2005, the average maternal and gestational ages of perinatal cases at disease onset (31 years and 28 weeks, respectively) were lower compared to those in 2004.

Sex: In 2005, one infant was identified as male, the other two infants' genders are not known. In 2004 and 2003, the male to female ratios were 2:3 and 2:1, respectively.

Race/Ethnicity: Similar to both 2003 and 2004, in 2005 67% (n=2) of the cases were Latino and 33% (n=1) were White. In 2002, Latinos comprised 71% of the perinatal cases. 1999 U.S. Census data documented 62.2% and 19.0% of all LAC live births were by Latino and White mothers, respectively.

Location: In 2005, two cases resided in SPA 4 (Hollywood-Wilshire and Northeast health districts) and one resided in SPA 6 in the Southeast health district. Neither of these SPAs had any cases of perinatal listeriosis last year.

Type of Delivery: One infant (33%) was delivered by caesarian section. One stillbirth was delivered vaginally (33%). It is not known how the remaining case delivered her infant.

Outcome: There were no maternal fatalities. One (33%) neonate was stillborn at 20 weeks of gestation, one (33%) was delivered sick at 34 weeks of gestation, and one (33%) was delivered healthy at full term after treatment at 31 weeks of gestation.

Culture Sites: Listeriosis was culture confirmed in three mothers and one neonate. Among culture-positive mothers, three (100%) mothers had *L. monocytogenes* isolated from blood only. In one of those cases, both mother and infant had positive cultures of *L. monocytogenes* from blood.

Maternal clinical signs/outcomes: In 2005, all three mothers had fevers and three (100%) had sepsis. Similar to the previous two years, all mothers were symptomatic and no mothers had meningitis.

Onset: In 2005, one infant was born alive but sick, one was born alive and healthy, and one was stillborn.

High-risk Foods: All three mothers reported eating at least one potentially high-risk food. Two women (67%) ate Mexican-style cheese; the other woman reported eating unpasteurized gourmet cheese. Three (100%) ate raw vegetables, one (33%) ate cold cuts or deli meats, all (100%) ate soft cheese, and one (33%) ate yeast products (Table 1).

Risk factors: Only one mother had predisposing medical factors other than pregnancy. She had a history of urinary tract infections and took iron medication which might have helped the *L. monocytogenes* proliferate. The outcome of this case was stillbirth at 31 weeks of gestation.

Only one (33%) mother had traveled outside the United States during pregnancy. She was a recent immigrant from Mexico and had given birth to a sick infant male at 34 weeks of gestation.

PREVENTION

L. monocytogenes is found in soil and water. Animals can carry *Listeria* without appearing ill, which can result in contaminated foods of animal origin, such as meats and dairy products. In particular, studies have implicated unpasteurized milk or milk products; soft cheeses (Mexican-style, Brie, Feta, blue-veined, Camembert); undercooked meat, such as beef, pork, poultry, and pâté; and cold cuts from deli counters. Pregnant women should avoid these foods. In particular, cheese sold by street vendors, or obtained from relatives/friends in other countries where food processing quality assurance is unknown should be avoided by pregnant women.

Table 1. High-risk Foods among Cases of Perinatal Listeriosis—LAC, 2005

Risk foods	Number	Percent
Raw Fruit	3	100
Mexican-style Cheese	2	67
Other Cheese	2	67
Raw Vegetables	3	100
Cold Cuts/ Deli Meats	1	33
Soft Cheese	2	67
Yeast Products	1	33
Raw Milk	1	33

In addition, fruits and vegetables should be thoroughly washed. Uncooked meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating. Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, pregnant women may choose to avoid these foods or thoroughly reheat cold cuts before eating.

Given the seasonality of perinatal listeriosis, prevention strategies should take effect before April. Possible preventive methods include education during prenatal checkups, outreach to Hispanic/Latino communities, and food safety notices at food and deli markets.

COMMENTS

Incidence of perinatal listeriosis in LAC is less than ten cases per year for the fifth consecutive year. Prevention efforts should be targeted towards Hispanic and White women, especially with Hispanics being the fastest growing segment of the LAC population. There were no perinatal cases associated with outbreaks in 2005.

All isolates of *L. monocytogenes* are typed by pulsed-field gel electrophoresis (PFGE), a technique to detect matching strains of various pathogenic agents. When matches between isolates from patients or foods are detected, an investigation may be initiated. In addition, a solitary case occurring locally can be linked by PFGE results to an outbreak occurring on a wider geographical scale. In 2005, there were no cases of *L. monocytogenes* in LAC associated with a multi-jurisdictional outbreak identified in this manner.

ADDITIONAL RESOURCES

General disease information is available from the CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/listeriosis_g.htm

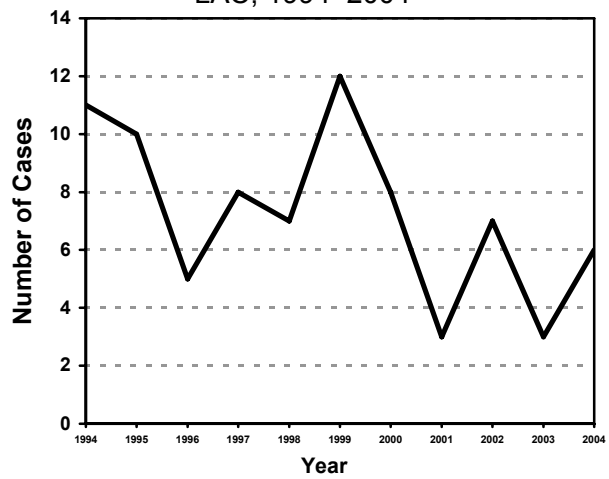
General information and reporting information about this and other foodborne diseases in LAC is available at: www.lapublichealth.org/acd/food.htm

LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases [a]	6
Annual Incidence [b] LA County United States	 ---[c] N/A
Age at Onset Maternal: Mean Median Range Infant Gestational: Mean Median Range	 25 years 33 years 17-39 years 31 weeks 31 weeks 21-38 weeks
Case Fatality LA County United States	 33%[d] N/A

[a] Cases are mother-infant pairs.
[b] Cases per 100,000 population.
[c] Rates based on less than 20 observations are unreliable.
[d] Among fetal/neonate cases only, no maternal deaths included.

Figure 1
Perinatal Listeriosis
Cases by Year of Onset
LAC, 1994–2004



DESCRIPTION

Perinatal listeriosis is a disease transmitted transplacentally from infected pregnant women; these women may experience only mild flu-like symptoms or may be asymptomatic. A perinatal listeriosis case is defined as a mother-infant pair in which one or both persons has a positive *Listeria monocytogenes* culture from a normally sterile site. Neonatal/infant listeriosis is often divided into early onset (0–6 days after birth) and late onset (7–42 days after birth). Infection during pregnancy may lead to premature birth, stillbirth, or septicemia and/or meningitis in the neonate—even if the mother is asymptomatic. There is no vaccine to prevent listeriosis.

DISEASE ABSTRACT

- Perinatal listeriosis increased from three cases in 2003 to six cases in 2004 (Figure 1).
- Regarding infants, two were stillborn at 21 and 31 weeks of gestation, two were born sick at 31 and 38 weeks of gestation, one was born alive and healthy at 36 weeks of gestation, and one continued to term after antibiotic treatment at 27 weeks of gestation.

STRATIFIED DATA

Trends: Since 2001, the annual incidence of perinatal listeriosis has see-sawed, ranging from three to seven cases (Figure 1).

Seasonality: In 2004, the seasonality of perinatal listeriosis did not deviate from the average annual incidence of the previous five years; higher levels of incidence occurred between April and October, particularly in August (Figure 2).

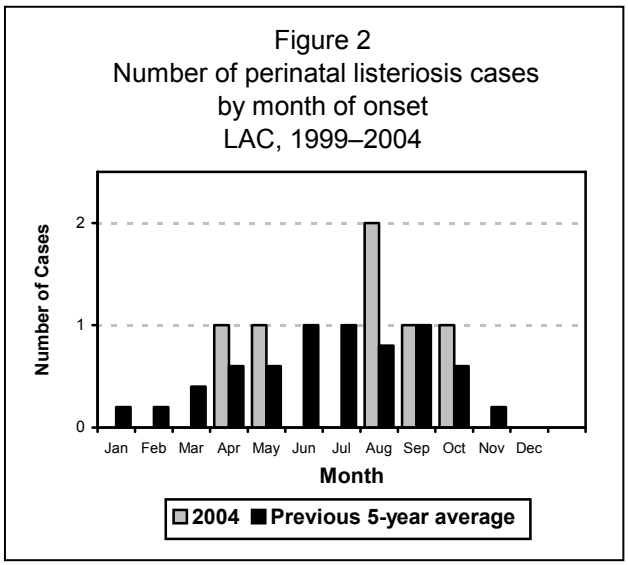


Figure 2
Number of perinatal listeriosis cases
by month of onset
LAC, 1999–2004

Age: During 2004, the average maternal and gestational ages of perinatal cases at disease onset (25 years and 31 weeks, respectively) were lower compared to those in 2003 (33 years and 36 weeks).

Sex: In 2004, the male to female infant ratio was 2:3. In 2003 and 2002, the ratios were 2:1 and 2:4, respectively.

Race/Ethnicity: Similar to 2003, in 2004 67% (n=4) of the cases were Latino and 33% (n=2) were White. In 2002, Latinos comprised 71% of the perinatal cases. 1999 U.S. Census data documented 62.2% and 19.0% of all LAC live births were by Latino and White mothers, respectively.

Location: In 2004, two cases resided in the West / Burke health district (SPA 5) and two resided in the San Fernando health district (SPA 2). The other two cases resided in different health districts but both are located in SPA 7. Of these three SPA's, only SPA 5 saw perinatal listeriosis (n=1, 33%) last year.

Type of Delivery: Three infants (50%) were delivered vaginally, and two (33%) by caesarian section. The type of delivery was unknown for the case which involved the mother who was treated for listeriosis at 27 weeks of gestation and then delivered at full term.

Outcome: There were no maternal fatalities. Two (33%) neonates were stillborn at 21 and 31 weeks of gestation, two (33%) were delivered sick at 31 and 38 weeks of gestation, one (17%) was delivered alive and healthy at 36 weeks of gestation, and one (17%) was delivered healthy at full term after treatment at 27 weeks of gestation.

Culture Sites: Listeriosis was culture confirmed in four mothers and two neonates. There were no cases where both mother and infant had positive cultures for *L. monocytogenes*. Among culture-positive mothers, two (50%) mothers had *L. monocytogenes* isolated from blood only, one (25%) from the placenta, and one (25%) from blood and placenta. Among the two culture-positive infants, one infant had an isolate from blood only, and the other had isolates from the ear and the rectum.

Maternal clinical signs/outcomes: In 2004, all six mothers had fevers and three (50%) had sepsis. Similar to the previous two years, all mothers were symptomatic and no mothers had meningitis.

Onset: In 2004, all infants born were classified as early-onset (0–6 days after birth).

High-risk Foods: Five (83%) of six mothers reported eating at least one potentially high-risk food. Five (83%) mothers ate raw fruit, four (67%) ate Mexican-style cheese, four ate other types of cheese (Monterey Jack, Mozzarella, American, Cheddar), four (67%) ate raw vegetables, three (50%) ate cold cuts or deli meats, two (33%) ate soft cheese, and two (33%) ate yeast products (Table 1).

Risk factors: Only one mother had predisposing medical factors other than pregnancy. She had a history of urinary tract infections and took iron medication which might have helped the *L. monocytogenes* proliferate. The outcome of this case was stillbirth at 31 weeks of gestation.

Three (50%) mothers had traveled outside the United States during pregnancy. One of these emigrated from Mexico and had a stillbirth at 21 weeks of gestation.

PREVENTION

L. monocytogenes is found in soil and water. Animals can carry *Listeria* without appearing ill, which can result in contaminated foods of animal origin, such as meats and dairy products. In particular, studies have implicated unpasteurized milk or milk products; soft cheeses (Mexican-style, Brie, Feta, blue-veined, Camembert); undercooked meat, such as beef, pork, poultry, and paté; and cold cuts from deli counters. Pregnant women should avoid these foods. In particular, cheese sold by street vendors, or obtained from relatives/friends in other countries where food processing quality assurance is unknown should be avoided by pregnant women.

Table 1. High-risk Foods among Cases of Perinatal Listeriosis—LAC, 2004

Risk foods	Number	Percent
Raw Fruit	5	83
Mexican-style Cheese	4	67
Other Cheese	4	67
Raw Vegetables	4	67
Cold Cuts/ Deli Meats	3	50
Soft Cheese	2	33
Yeast Products	2	33
Raw Milk	1	17

In addition, fruits and vegetables should be thoroughly washed. Uncooked meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating. Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, pregnant women may choose to avoid these foods or thoroughly reheat cold cuts before eating.

Given the seasonality of perinatal listeriosis, prevention strategies should take effect before April. Possible preventive methods include education during prenatal checkups, outreach to Hispanic/Latino communities, and food safety notices at food and deli markets.

COMMENTS

Incidence of perinatal listeriosis in LAC is less than ten cases per year for the fifth consecutive year. Prevention efforts should be targeted towards Hispanic and White women, especially with Hispanics being the fastest growing segment of the LAC population. There were no perinatal cases associated with outbreaks in 2004.

All isolates of *L. monocytogenes* are typed by pulsed-field gel electrophoresis (PFGE), a technique to detect matching strains of various pathogenic agents. When matches between isolates from patients or foods are detected, an investigation may be initiated. In addition, a solitary case occurring locally can be linked by PFGE results to an outbreak occurring on a wider geographical scale. In 2004, there were no cases of *L. monocytogenes* in LAC associated with a multi-jurisdictional outbreak identified in this manner. However, in October 2004, a perinatal case and nonperinatal case in LAC were part of cluster 0412ml-1ca which by January 2005 became a five-person cluster with isolates from California, Wisconsin, and New Jersey. No epidemiologic links were identified to indicate that the cluster was an outbreak.

ADDITIONAL RESOURCES

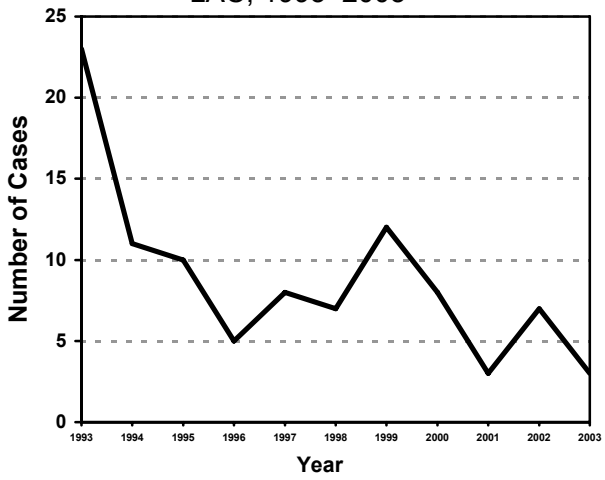
General disease information is available from the CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/listeriosis_g.htm

General information and reporting information about this and other foodborne diseases in LAC is available at: www.lapublichealth.org/acd/food.htm

LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases [a]	3
Annual Incidence [b] LA County United States	 ---[c] N/A
Age at Onset Maternal: Mean Median Range Infant Gestational: Mean Median Range	 33 years 36 years 24-40 years 34 weeks 37 weeks 27-38 weeks
Case Fatality LA County United States	 33%[d] N/A

Figure 1
Perinatal Listeriosis
Cases by Year of Onset
LAC, 1993–2003



[a] Cases are mother-infant pairs.
[b] Cases per 100,000 population.
[c] Rates based on less than 20 observations are unreliable.
[d] Among fetal/neonate cases only, no maternal deaths included.

DESCRIPTION

Perinatal listeriosis is a disease transmitted transplacentally from infected pregnant women; these women may experience only mild flu-like symptoms or may be asymptomatic. A perinatal listeriosis case is defined as a mother-infant pair in which one or both persons has a positive *Listeria monocytogenes* culture from a normally sterile site. Neonatal/infant listeriosis is divided into early onset (0–6 days after birth) and late onset (7–42 days after birth). Infection during pregnancy may lead to premature birth, stillbirth, or septicemia and/or meningitis in the neonate—even if the mother is asymptomatic. There is no vaccine to prevent listeriosis.

DISEASE ABSTRACT

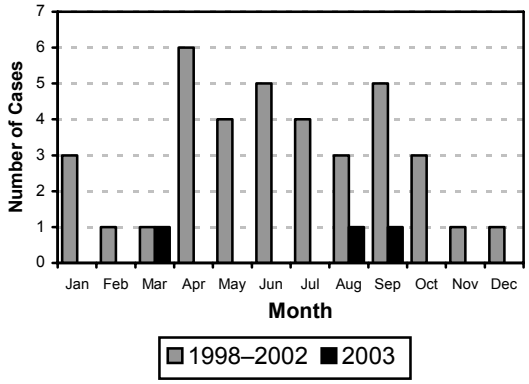
- Perinatal listeriosis decreased from 23 cases to 11 cases in 1994 and has generally continued to decrease (Figure 1).
- Of the affected infants, one died after birth at 27 weeks of gestation, and two were born alive and asymptomatic at 37 and 38 weeks of gestation. The infants born in weeks 27 and 37 had positive blood cultures for *L monocytogenes*.

STRATIFIED DATA

Trends: Perinatal listeriosis increased from three cases in 2001 to seven cases in 2002; however, the number of cases decreased to three in 2003 (Figure 1).

Seasonality: From 1998 to 2002, incidence peaked in January, April, June, and September. Higher levels of incidence occurred between April and October (Figure 2). In 2003, cases occurred in early spring and late summer.

Figure 2
Number of perinatal listeriosis cases
by month of onset
LAC, 1998–2003



Age: During 2003, the average maternal and gestational ages of perinatal cases (33 years and 34 weeks, respectively) were slightly higher compared to those in 2002 (28 years and 32 weeks). The one fatality in 2003 was born to a 24-year-old woman after 27 weeks of gestation.

Sex: In 2003, infant cases were two males (67%) and one female. The male that died and the female had positive blood cultures for *L monocytogenes*. In 2002, of six newborns, two (33%) were male; of the two positive isolates from newborns, one male had a blood culture and one female had a lung fluid culture.

Race/Ethnicity: The male that died and the female were Hispanic (67%); the remaining infant was White. Of the seven 2002 perinatal cases, five (71%) were Hispanic and one (14%) was White.

Location: The two perinatal cases that survived were from West Los Angeles: the Hollywood-Wilshire health district (SPA 4) and the West / Burke health district (SPA 5). The other case was from the Pomona health district (SPA 3).

Type of Delivery: The male infants were delivered by caesarian section, and the female was delivered vaginally.

Outcome: All mothers survived; one (33%) infant died.

Culture Sites: Of the three births, two infants (67%) had blood taken only and the surviving male infant (33%) had CSF taken in addition to blood (see Table 1 for results). The mothers of the male children had blood tested for *L. monocytogenes* and only the mother with the surviving infant tested positive. In 2002, of seven perinatal cases, three (43%) newborns/fetuses had blood and CSF cultures, one had only blood culture, one had heart fluid and lung fluid cultured, and two had no cultures done. Four (57%) mothers had positive blood cultures, another mother had positive nasopharyngeal and umbilical cord cultures, and two mothers (29%) were missing culture information.

Onset: In 2003, all cases were classified as early-onset (0–6 days after birth).

High-risk Foods: When high-risk foods were assessed as possible causes for infection, all mothers reported consumption of Mexican cheese or soft cheese, and one also reported consumption of raw fruits and vegetables.

Risk factors: Other than pregnancy, the mother of the non-surviving infant had no other known risk factors. The mother of the female infant reported excavation around home and the mother of the surviving male infant reported chronic alcoholism.

Table 1. Reported results* for *Listeria monocytogenes* isolates from Mothers and Infants—LAC, 2003

	Positive cultures			
	Mother (n=3)		Infant (n=3)	
Culture Site	**Number**	**Percent**	**Number**	**Percent**
Blood	1	33	2	67
CSF	0	0	0	0

* Percentages may exceed 100% as cultures were obtained from more than one site in some cases.

PREVENTION

L monocytogenes is found in soil and water. Animals can carry *Listeria* without appearing ill, which can result in contaminated foods of animal origin, such as meats and dairy products. In particular, studies have implicated unpasteurized milk or milk products ; soft cheeses (Mexican-style, Brie, Feta, blue-veined, Camembert); undercooked meat, such as beef, pork, poultry, and paté; and cold cuts from deli counters. Pregnant women should avoid these foods. In particular, cheese sold by street vendors, or obtained from relatives/friends in other countries where food processing quality assurance is unknown should be avoided by pregnant women.

In addition, fruits and vegetables should be thoroughly washed. Uncooked meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating. Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, pregnant women may choose to avoid these foods or thoroughly reheat cold cuts before eating.

Given the seasonality of perinatal listeriosis, prevention strategies should take effect before April. Possible preventive methods include education during pregnancy checkups, outreach in Hispanic/Latino communities, and food safety notices at food and deli markets.

COMMENTS

Incidence of perinatal listeriosis in LAC is less than ten cases per year for the fourth consecutive year. Although only three cases occurred in 2003, Hispanic women still seem to be a good target for prevention, particularly because Hispanics are the fastest growing segment of the LAC population. There were no perinatal cases associated with outbreaks in 2003.

All isolates of *L. monocytogenes* are typed by pulsed-field gel electrophoresis (PFGE), a technique to detect matching strains of various pathogenic agents. When matches between isolates from patients or foods are detected, an investigation may be initiated. In addition, a solitary case occurring locally can be linked by PFGE results to an outbreak occurring on a wider geographical scale. In 2003, there were no cases of *L. monocytogenes* in LAC associated with a multi-jurisdictional outbreak identified in this manner.

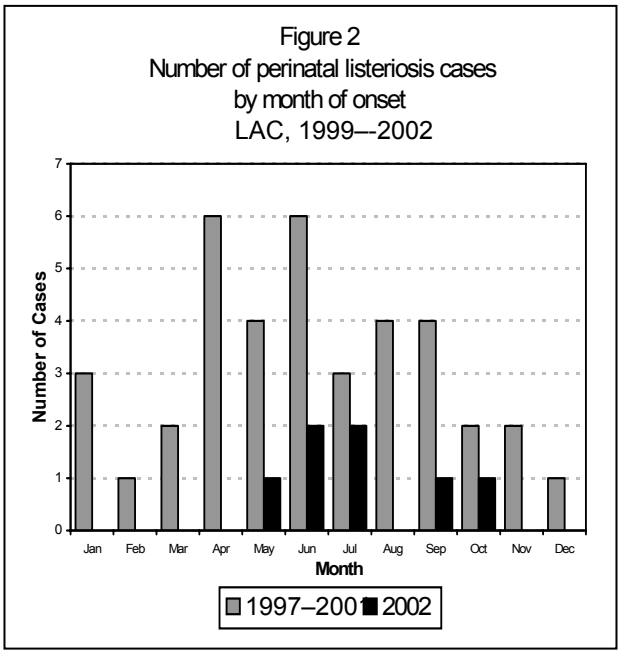
ADDITIONAL RESOURCES

General disease information is available from the CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/listeriosis_g.htm

General information and reporting information about this and other foodborne diseases in LAC is available at: www.lapublichealth.org/acd/food.htm

LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases[a]	7
Annual Incidence[b] LA County United States	 ---[c] N/A
Age at Onset Maternal: Mean Median Range Infant Gestational: Mean Median Range	 28 years 28 years 17–39 years 32 weeks 36 weeks 16–39 weeks
Case Fatality[d] LA County United States	 29% N/A



[a] Cases are mother-infant pairs.
[b] Cases per 100,000 population.
[c] Rates based on less than 20 observations are unreliable.
[d] Among fetal/neonate cases only, no maternal deaths included.

DESCRIPTION

Perinatal listeriosis is a disease transmitted transplacentally from infected pregnant women; these women may experience only mild flu-like symptoms or may be asymptomatic. A perinatal listeriosis case is defined as a mother-infant pair in which one or both persons has a positive *Listeria monocytogenes* culture from a normally sterile site. Neonatal/infant listeriosis is divided into early onset (0–6 days after birth) and late onset (7–42 days after birth). Infection during pregnancy may lead to premature birth, stillbirth, or septicemia and/or meningitis in the neonate—even if the mother is asymptomatic. There is no vaccine to prevent listeriosis.

DISEASE ABSTRACT

- While the number of perinatal listeriosis had been decreasing since 1993, incidence increased 130% from 3 cases in 2001 to 7 cases in 2002.
- Among the affected infants, two (29%) were stillbirths, four cases (57%) were born alive and healthy, and one case (14%) was not born during the time the mother presented with *L monocytogenes*.

STRATIFIED DATA

Trends: In 2002, perinatal listeriosis incidence increased after declining since 1999 (Figure 1).

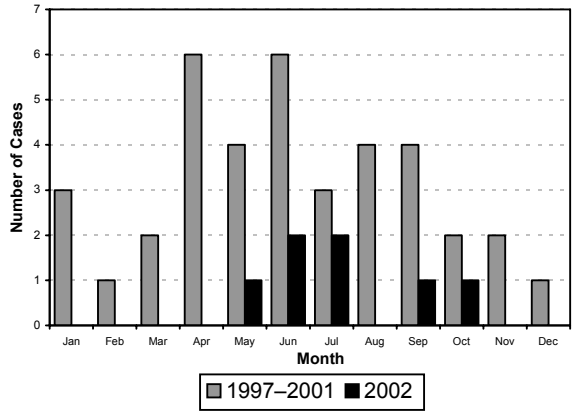
Seasonality: From 1997 to 2002, the number of cases tends to increase during the spring and summer months (Figure 2). In 2002, more than half of the cases (n=4) occurred in June and July.

Age: During 2002, the average maternal and gestational ages of perinatal cases (28.1 years and 32 weeks, respectively) were slightly lower compared to those in 2001 (29.7 year and 33 weeks). Of the two case fatalities, stillbirths occurred at 16 and 37 weeks.

Sex: In 2001, all newborns/fetuses (n=3) of the perinatal cases were born female. In 2002, with one fetus unborn during the mother's presentation with listeriosis, there were two male and four female newborns/fetuses testing positive for *L monocytogenes*.

Race/Ethnicity: The majority of cases were Hispanic (n=5, 71%), one (14%) was Asian, and one was White. Of the two case fatalities, one was Hispanic and one was Asian.

Figure 2
Number of perinatal listeriosis cases
by month of onset
LAC, 1999–-2002



Location: Two perinatal cases were from the South health district (SPA 6), and one case was from one of the following health districts: Glendale (SPA 2), Alhambra (SPA 3), Hollywood-Wilshire (SPA 4), San Antonio (SPA 7), and Torrance (SPA 8).

Type of Delivery: Of the six births, the method of delivery was caesarian section for two cases, vaginal for two cases, and unknown for two.

Outcome: All mothers survived but two (29%) newborns/fetuses died.

Culture Sites: Of the six births, three (43%) newborns/fetuses had blood and CSF cultures, one had only blood culture, one had heart fluid and lung fluid cultured, and two had no cultures done (Table 1). Four (57%) mothers had positive blood cultures, another mother had positive nasopharyngeal and umbilical cord cultures, and two mothers (29%) were missing culture information.

Onset: In 2002, all cases were classified as early-onset (0–6 days after birth).

High-risk Foods: When high-risk foods were assessed as possible causes for infection, most mothers reported having eaten Mexican cheese (n=5, 71%), one (14%) mother drank raw milk, one ate soft cheese, one ate cold cuts and raw eggs, two (29%) ate raw fruit, and two ate raw vegetables.

Table 1. Frequency and Percent* of *Listeria monocytogenes* Isolates From Mothers and Infants—LAC, 2002

	Mother (n=7)		Infant (n=7)	
Culture Site	**Number**	**Percent**	**Number**	**Percent**
Blood	4	57	4	57
CSF	0	0	3	43
Nasopharyngeal	1	14	0	0
Umbilical cord	1	14	0	0
Placenta	0	0	0	0
Heart fluid	0	0	1	14
Lung fluid	0	0	1	14

* Percentages may exceed 100% as cultures were obtained from more than one site in some cases.

PREVENTION

L monocytogenes is found in soil and water. Animals can carry *Listeria* without appearing ill, which can result in contaminated foods of animal origin, such as meats and dairy products. In particular, studies have implicated unpasteurized milk or products made from unpasteurized milk; soft cheeses (Mexican-style, Brie, Feta, blue-veined, Camembert); undercooked meat, such as beef, pork, poultry, and pate; and cold cuts from deli counters. Pregnant women should avoid these foods. In particular, cheese sold by street vendors, or obtained from relatives/friends in other countries where food processing quality assurance is unknown should be avoided by pregnant women.

In addition, fruits and vegetables should be thoroughly washed. Uncooked meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating. Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, pregnant women may choose to avoid these foods or thoroughly reheat cold cuts before eating.

Given the seasonality of perinatal listeriosis, prevention strategies should take effect before June. Possible preventive methods include education during pregnancy checkups, outreach in Hispanic/Latino communities, and food safety notices at food and deli markets.

COMMENTS

Although twice as many perinatal listeriosis cases occurred in 2002 compared to 2001, the incidence is still less than ten cases per year. Hispanic women pregnant with female babies are at highest risk. The five Hispanic mothers were the five cases who ate Mexican-style fresh cheese, a source of *L monocytogenes* infection in previous outbreaks. As the Hispanics are the fastest growing segment of the LAC population, prevention in this group becomes ever important. There were no perinatal cases associated with outbreaks in 2002.

All isolates of *L monocytogenes* are now typed by pulsed-field gel electrophoresis (PFGE), a technique to detect matching strains of various pathogenic agents. When matches between isolates from patients or foods are detected, an investigation may be initiated. In addition, a solitary case occurring locally can be linked by PFGE results to an outbreak occurring on a wider geographical scale. In 2002, there were no cases of *L monocytogenes* in LAC associated with a multi-jurisdictional outbreak identified in this manner.

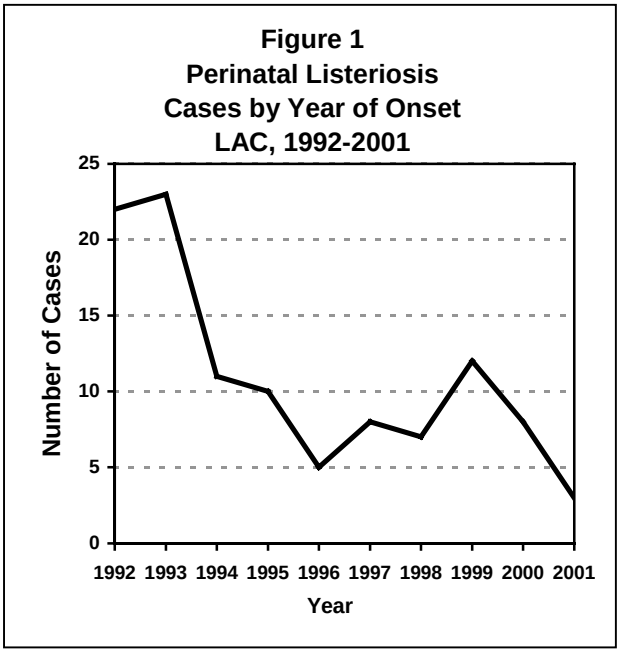
ADDITIONAL RESOURCES

General disease information is available from the CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/listeriosis_g.htm

General information and reporting information about this and other foodborne diseases in LAC is available at: www.lapublichealth.org/acd/food.htm

LISTERIOSIS, PERINATAL

CRUDE DATA	
Number of Cases	3
Annual Incidence LA County United States	 0.30[a] 0.21[a]
Age at Onset Maternal: Mean Median Range Infant Gestational: Mean Median Range	 30 yrs 31 23-25 33 wks 31 30-38
Case Fatality LA County United States	 0.0% N/A



[a] Rates include both nonperinatal and perinatal cases.

DESCRIPTION

Listeriosis is a disease transmitted primarily through consumption of food contaminated with *Listeria monocytogenes* (*LM*), a gram-positive bacterium. *LM* is found in soil and water, and may contaminate raw foods, such as uncooked meats and vegetables, as well as processed foods that become contaminated after processing, such as soft cheeses and cold cuts. Unpasteurized (raw) milk or foods made from unpasteurized milk may also contain the bacterium.

Infected pregnant women may experience only mild flu-like symptoms or may be asymptomatic. A perinatal listeriosis case is defined as a pregnant woman, fetus or neonate with infection of a sterile site with *LM.* Neonatal/infant listeriosis is divided into early onset (0-6 days after birth) and late onset (7-42 days after birth). Infection during pregnancy may lead to premature birth, stillbirth, or septicemia and/or meningitis in the neonate, even if the mother is asymptomatic. There is no vaccine to prevent listeriosis.

DISEASE ABSTRACT

- The perinatal listeriosis incidence has been declining since 1999, and is the lowest seen in LAC over the last 10 years.
- All three cases in 2001 were early onset, and they all survived.

STRATIFIED DATA

Trends: The 2001 perinatal listeriosis incidence has decreased annually since 1999 (Figure 1).

Seasonality: There were too few cases to look for seasonality. Two of the cases occurred in April and one case in July.

Age: The three women were ages 23, 31, and 35. Two delivered prematurely at 31 and 33 weeks while third was 38 weeks.

Sex: All three infants born to 2001 cases were female.

Race/Ethnicity: Two of the cases were Latino, and one was Asian.

Location: The three perinatal cases were from three different health districts; Pomona, Southwest and Whittier.

Type of Delivery: The method of delivery was Caesarian section for two cases and vaginal for one case. Two cases delivered prematurely at 31 and 33 weeks; the third delivered at 38 weeks gestitation.

Outcome: All three infants and mothers survived.

Culture Sites: Sites of *LM* isolation were from blood, placenta, and tracheal aspirate. No *LM* isolations were from amniotic fluid (Table 1). All three infants were blood culture positive for *LM*. Two mothers had positive blood cultures, with one having a positive tracheal fluid culture as well. The third mother had a positive placental culture.

Onset: In 2001, all cases were classified as early-onset.

Table 1: Frequency (%)* of *Listeria monocytogenes* Isolates From Mothers and Infants, LAC, 2001

	Mother (n=3)		Infant (n=3)	
Culture Site	**Number**	**Percent**	**Number**	**Percent**
Blood	2	67	3	100
Placenta	1	33	0	0
Tracheal Aspirate	1	33	1	33
Amniotic Fluid	0	0	N/A	

* Percentages may exceed 100% as cultures were obtained from more than one site in some cases.

COMMENTS

Cases of perinatal listeriosis have decreased compared to the number of cases in 1999 and 2000. Incidence by race has shifted; however the numbers are small. Latino mothers (n=2) now have the highest incidence whereas White mothers (n=4) had the highest incidence in 2000. There were no perinatal cases associated with outbreaks in 2001.

All isolates of *LM* are now typed by pulsed-field gel electrophoresis (PFGE), a technique to

detect matching strains of various pathogenic agents. When matches between isolates from patients or foods are detected, an investigation may be initiated. In addition, a solitary case occurring locally can be linked by PFGE results to an outbreak occurring on a wider geographical scale. In 2001, there were no cases of *LM* in LAC associated with a multi-jurisdictional outbreak identified in this manner.

PREVENTION

LM is found in soil and water. Animals can carry *Listeria* without appearing ill, which can result in contaminated foods of animal origin, such as meats and dairy products. In particular, studies have implicated unpasteurized milk or products made from unpasteurized milk; soft cheeses (Mexican-style, Brie, Feta, blue-veined, Camembert); undercooked meat, such as beef, pork, poultry, and pate; and cold cuts from deli counters. Pregnant women should avoid these foods. In particular, cheese sold by street vendors, or obtained from relatives/friends in other countries where food processing quality assurance is unknown should be avoided by pregnant women.

In addition, fruits and vegetables should be thoroughly washed. Uncooked meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating. Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, pregnant women may choose to avoid these foods or thoroughly reheat cold cuts before eating.