



LEGIONELLOSIS

CRUDE DATA	
Number of Cases	140
Number of Deaths	21
Annual Incidence ^a	
LA County	1.48
California ^b	0.92
United States ^b	0.69
Age at Diagnosis	
Mean	67.4
Median	67
Range	28–99 years

^aCases per 100,000 population.

^bCalculated from Final 2014 Reports of Nationally Notifiable Infectious Diseases. MMWR 64(36):1019–1033.

DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute, self-limited influenza-like illness without pneumonia. *Legionella* bacteria are common inhabitants of aquatic systems that thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila* serogroup 1 (LP1), although at least 46 *Legionella* species and 70 serogroups have been identified. Transmission occurs through inhalation of aerosolized water containing the bacteria or by aspiration of contaminated water. Person-to-person transmission does not occur. The case-fatality rate for LD ranges from 10% to 15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects older persons, particularly those who are heavy smokers, have chronic underlying diseases such as diabetes mellitus, congestive heart failure, lung disease, or whose immune systems are suppressed by illness or medication.

The implementation of water safety measures to control the risk of transmission of *Legionella* to susceptible hosts in hospitals, hotels, and public places with water related amenities remains the primary means of reducing LD. Approaches include periodic inspection of water sources, distribution systems, heat exchangers, and cooling towers. Prevention strategies include appropriate

disinfection, monitoring, and maintenance of both cold and hot water systems, and setting the hot water temperature to 50 degrees Celsius or higher to limit bacterial growth. All healthcare-associated LD case reports are investigated to identify potential outbreak situations. Early recognition and investigation is crucial for timely implementation of control measures.

2014 TRENDS AND HIGHLIGHTS

- In 2014, there were 140 cases reported (incidence 1.48/100,000) which is 65% higher than 2013 (Figure 1) but consistent with national rates.
- No Pontiac fever was reported.
- The case fatality rate increased from 8.2% in 2013 to 15% in 2014.
- The most affected age group in LAC was persons 65 years of age and older (Figure 2), which is consistent over a 5 year period.
- Service Planning Area (SPA) 2 had the highest incidence this year followed by SPA 4 (Figure 3).
- The greatest number of cases was reported in December, consistent with the five-year average being highest during this month (Figure 4).
- The highest incidence rate occurred among blacks (2.7 per 100,000) followed by whites (2.3 per 100,000) (Figure 5).
- Travelers staying overnight in commercial lodging during the incubation period accounted for 5.0% of cases in 2014, compared to 12.9% of cases in 2013. No LAC resident was linked to multi-state outbreaks reported by CDC.
- Healthcare-associated legionellosis cases in skilled nursing facilities increased from 2.3% to 5.7% of cases with three fatalities, and from 0% to 2.1% in assisted living facilities with two fatalities. Healthcare-associated legionellosis cases in acute care facilities increased from 5.9% in 2013 to 8.6% of cases.
- One nosocomial legionellosis outbreak investigation involved three cases in an acute care hospital oncology unit. Two of the three patients had sputum specimens confirmed with LP6 at CDC. The third patient had only a urine antigen, which was positive for LP1. Water specimens collected from the room sinks of patients with sputum positive LP6 were also positive for LP6. Based on the investigation, two out of the three cases were epidemiologically



linked and likely exposed to *Legionella* from an environmental source in the facility. Recommendations were made to chlorinate per hospital protocol, and to work with an outside consultant to find a permanent solution to ensure adequate free chlorine levels.

- Another acute care hospital outbreak investigation involved four cases. Urine antigen for three of the four cases was positive for LP1. LP1 was not detected in the environment, but two *Legionella* spp., *L. anisa* and *L. feelei* were detected. Further water management and monitoring were recommended.
- One outbreak investigation involving three cases in a skilled nursing facility was conducted. All cases were urine antigen positive. LP1 was also detected in the environment, and it was determined that the cause of the legionellosis outbreak was the facility's water system. The facility will follow the legionella mitigation plan and EH recommendations.
- One outbreak investigation involved two cases in an assisted living facility. Both cases were culture positive for *Legionella pneumophila* and identified as LP6 by CDC. All water samples and swabs were negative for *Legionella* species. The source of this outbreak remains unknown.
- Two fatal cases from the same community, who used the community's hot tub during the incubation period were reported. One case tested positive for LP1 by PCR, post-mortem.

The second case's cause of death was noted as respiratory failure and community acquired pneumonia, but no testing was done to confirm LP. A joint ACDC/EH investigation of the community was conducted, and all environmental samples were negative for *Legionella*. Whereas the investigation suggests the hot tub as the possible source for these infections, laboratory tests of samples from the hot tub were negative.

- Six cases, 4.3% of confirmed cases, were associated with different gyms. This includes one LAC resident who was linked to a gym outbreak investigated out of LAC jurisdiction.
- Three new cases were associated with a 2013 spa outbreak, which led to re-opening the investigation. The spa voluntarily closed the facility. After two hyper-chlorination and superheating procedures, water samples still tested positive for LP. Water filters were placed on high risk water features and after negative culture results, the spa reopened. Filters were removed after installation of a chlorine dioxide system, and follow-up water testing was negative for Legionella.



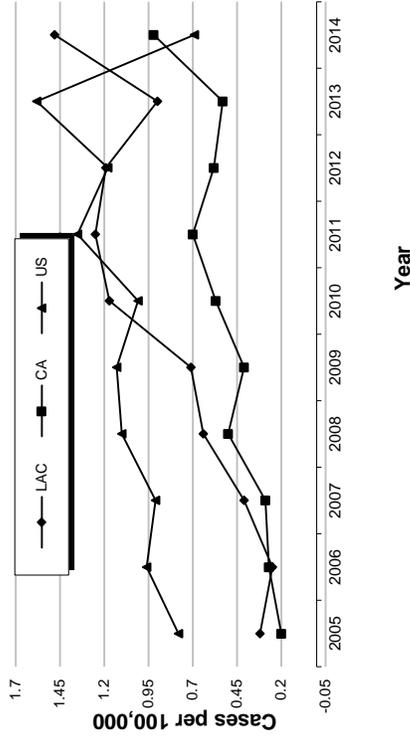
**Reported Legionellosis Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2010-2014**

Age Group	2010 (N=108)		2011 (N=116)		2012 (N=111)		2013 (N=85)		2014 (N=140)	
	No.	Rate/ 100,000 (%)	No.	Rate/ 100,000 (%)	No.	Rate/ 100,000 (%)	No.	Rate/ 100,000 (%)	No.	Rate/ 100,000 (%)
<1	0	-	0	-	0	-	0	-	0	-
1-4	0	-	0	-	0	-	0	-	0	-
5-14	0	-	0	-	1	0.9	0	-	0	-
15-34	3	2.8	5	4.0	4	3.6	3	3.5	3	2.1
35-44	9	8.4	7	6.0	6	5.4	4	4.7	11	7.9
45-54	25	23.1	21	18	21	18.9	12	14.1	17	12.1
55-64	27	25.0	22	19	18	16.2	19	22.4	29	20.7
65+	44	40.7	61	53	61	55.0	47	55.3	80	57.1
Unknown	0	-	0	-	0	-	0	-	0	-
Race/Ethnicity										
Asian	15	13.9	8	7.0	7	6.3	7	8.2	16	11.4
Black	25	23.1	20	17.2	16	14.4	16	18.8	21	15.0
Hispanic	25	23.1	37	32	32	28.8	24	28.2	39	27.9
White	41	38.0	47	40.5	49	44.1	34	40.0	62	44.3
Other	2	1.9	2	1.7	5	4.5	1	1.2	0	-
Unknown	0	-	2	1.7	2	1.8	3	3.5	2	1.4
SPA										
1	2	1.9	2	1.7	3	2.7	2	2.4	3	2.1
2	22	20.4	19	16.3	21	18.9	27	31.8	46	32.9
3	13	12.0	15	13	17	15.3	8	9.4	16	11.4
4	15	13.9	13	11.2	13	11.7	18	21.2	23	16.4
5	12	11.1	8	7.0	10	9.0	6	7.1	12	8.6
6	12	11.1	23	19.8	17	15.3	9	10.6	10	7.1
7	13	12.0	15	13	14	12.6	3	3.5	14	10.0
8	16	14.8	19	16.3	14	12.6	12	14.1	14	10.0
Unknown	3	2.7	2	1.7	2	1.8	0	-	2	1.4

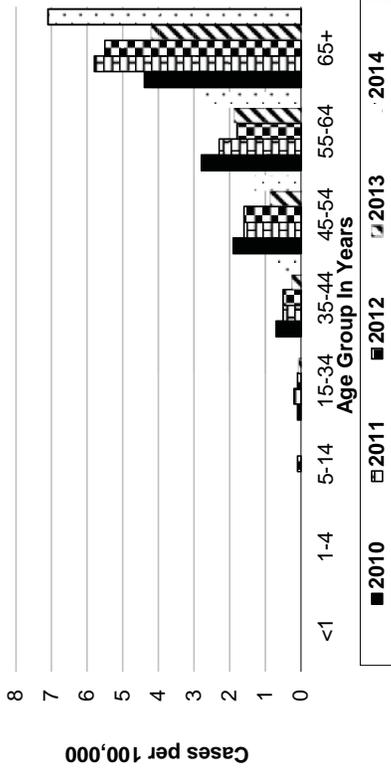
*Rates calculated based on less than 19 cases or events are considered unreliable.



**Figure 1. Incidence Rates of Legionellosis
LAC, CA and US, 2005-2014**



**Figure 2. Incidence Rates of Legionellosis by Age Group
LAC, 2010 - 2014**



**Figure 3. Incidence Rates of Legionellosis by SPA
LAC, 2010-2014**

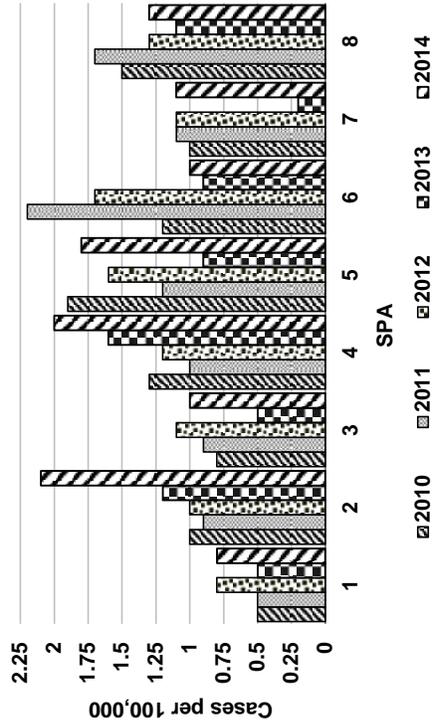




Figure 4. Reported Legionellosis Cases by Month of Onset
LAC, 2014 (N=140)

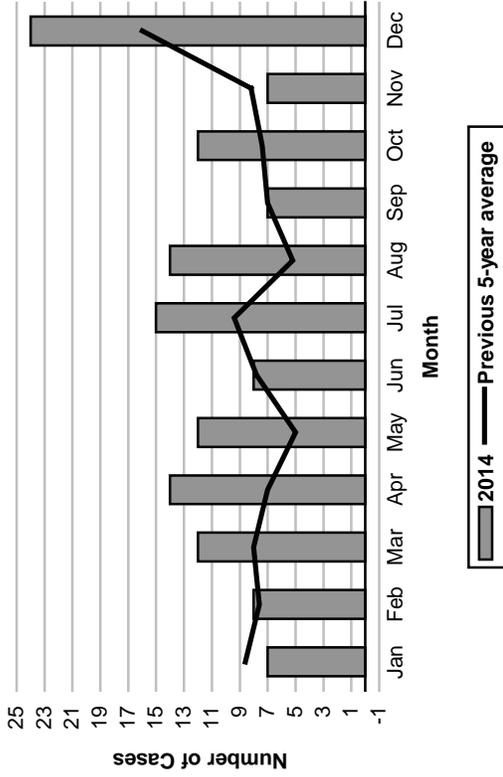
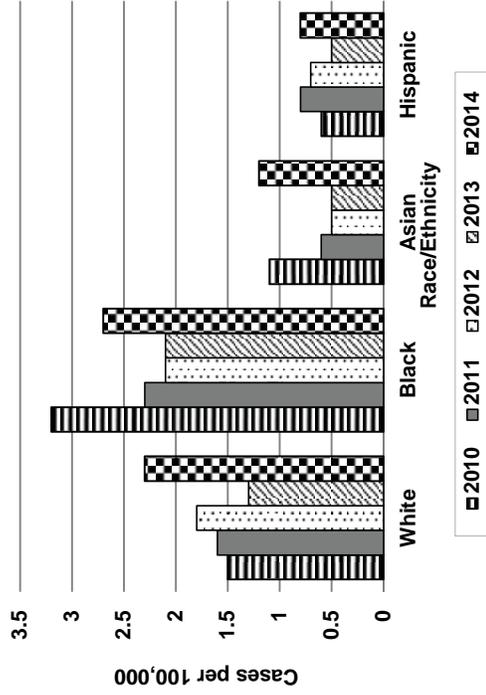
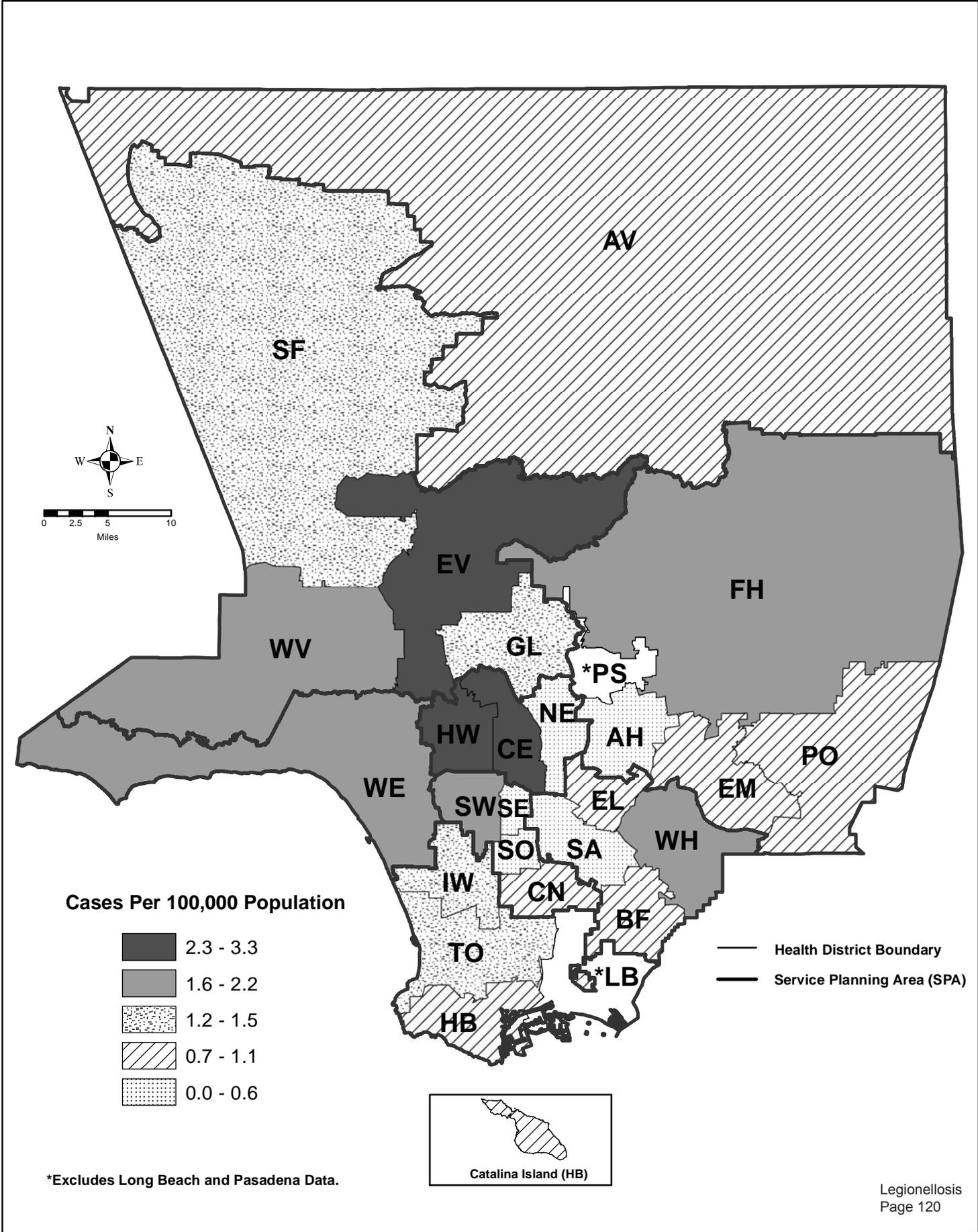


Figure 5. Legionellosis Rates by Race/Ethnicity
LAC, 2010- 2014



Map 8. Legionellosis Rates by Health District, Los Angeles County, 2014*





LEGIONELLOSIS

CRUDE DATA	
Number of Cases	111
Number of Deaths	14
Annual Incidence ^a	
LA County	1.19
California ^b	0.58
United States ^b	1.18
Age at Diagnosis	
Mean	65.8
Median	68
Range	6-94

^aCases per 100,000 population.

^bCalculated from Final 2012 Reports of Nationally Notifiable Infectious Disease. MMWR 62(33);669-682.

DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute, self-limited flu-like illness without pneumonia. *Legionella* bacteria are common inhabitants of aquatic systems that thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila* serogroup 1, although at least 46 *Legionella* species and 70 serogroups have been identified. Transmission occurs through inhalation of aerosolized water containing the bacteria or by aspiration of contaminated water. Person-to-person transmission does not occur. The case fatality rate for LD ranges from 10% to 15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects older persons, particularly those who are heavy smokers, have chronic lung disease, or whose immune systems are suppressed by illness or medication.

The implementation of water safety plans to control the risk of transmission of *legionella* to susceptible hosts in hospitals, hotels and public places with water related amenities remains the primary means of reducing LD. Plans include periodic inspection of water sources, distribution systems, heat exchangers, and cooling towers. Prevention strategies include appropriate disinfection, monitoring, and maintenance of both cold and hot water systems, and setting the hot

water temperature to 50 degrees Celsius or higher to limit bacterial growth. All healthcare-acquired LD case reports are investigated to identify potential outbreak situations. Early recognition and investigation is crucial for timely implementation of control measures.

2012 TRENDS AND HIGHLIGHTS

- In 2012, there were 111 cases reported (incidence 1.19/100,000) which is slightly less than 2011. (Figure 1)
- Three cases of Pontiac fever were reported.
- The case fatality rate decreased from 15.5% in 2011 to 12.6% in 2012.
- The most affected age group in Los Angeles county (LAC) was persons 65 years of age and older. (Figure 2).
- Service Planning Area (SPA) 6 had the highest incidence this year followed by SPA 5 (Figure 3).
- The number of cases reported in December was exceptionally high as compared to all other months. This seasonality has been seen in previous years, but not consistently (Figure 4).
- The highest incidence rate occurred among blacks (2.1 per 100,000) followed by whites (1.8 per 100,000). (Figure 5).
- People staying overnight in hotels during the incubation period accounted for 6.3% of confirmed cases, an increase from 3.4% in 2011. According to the CDC, more than 20% of all LD cases reported are associated with recent travel. No LAC resident was linked to any CDC reports of legionellosis found nationwide.
- Nosocomial legionellosis cases associated with skilled nursing facilities increased from 3.4% to 6.3% with three fatalities and from 4.3% to 4.5% in retirement assisted living facilities. Investigation and active case finding found no outbreak in either setting. However, another confirmed case was identified and linked to a retirement assisted living facility investigation in 2011-2012. The water system in this particular facility was remediated intensively during the time of the investigation. One acute care hospital had two fatal cases of possibly hospital acquired legionella. Two non-LAC residents were confirmed between August 2011 and February 2012 with hospital acquired legionellosis in an acute care hospital in LAC



that houses severely immunocompromised patients. Combined epidemiologic surveillance and environmental investigation to determine the source were conducted. Culture results of the two cases were the same serogroup, but environmental water culture results identified two different serogroups both of which differed from the cases. However, numerous environmental cultures were notable for non-pneumophila Legionella bacteria. A cluster of two confirmed cases from the same household, who regularly utilized a membership recreational gym with water amenities was investigated. ACDC and Recreational Waters investigated, which resulted in recommendations of minor violations. It was not determined if the gym was the source of the cluster of cases.



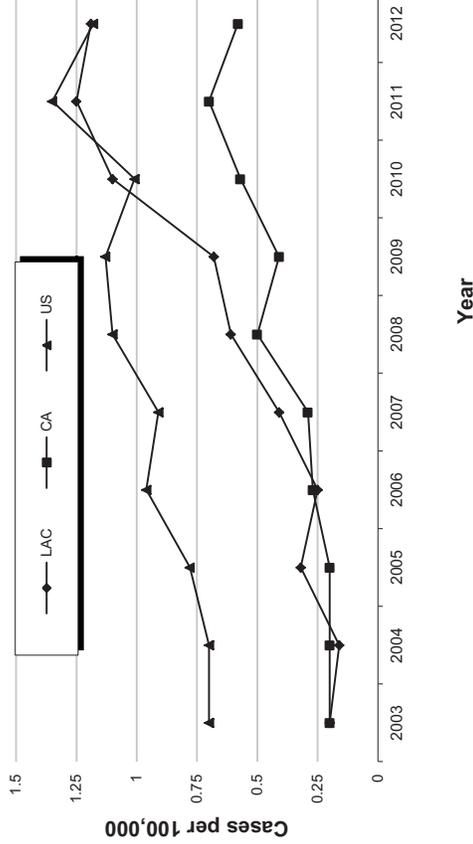
**Reported Legionellosis Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2008-2012**

Age Group	2008 (N=59)			2009 (N=66)			2010 (N=108)			2011 (N=116)			2012 (N=111)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
<1	0	0.0	0.0	1	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	1	0.9	0.1
15-34	1	1.7	0.0	2	3.0	0.1	3	3.0	0.1	5	4.0	0.2	4	3.6	0.1
35-44	5	8.5	0.3	3	4.5	0.2	9	8.0	0.6	7	6.0	0.5	6	5.4	0.5
45-54	7	11.9	0.5	11	16.6	0.8	25	23	1.8	21	18	1.6	21	18.9	1.6
55-64	12	20.3	1.3	14	21.2	1.5	27	25.0	2.8	22	19	2.3	18	16.2	1.8
65+	33	55.9	3.2	36	54.5	3.4	44	41	4.2	61	53	5.8	61	55.0	5.5
Unknown	0	0.0		0	0.0		0	0.0		0			0	0.0	0.0
Race/Ethnicity															
Asian	5	8.5	0.4	7	10.6	0.5	15	14.0	1.1	8	7.0	0.6	7	6.3	0.5
Black	11	18.6	1.3	14	21.2	1.6	25	23.1	2.9	20	17.2	2.3	16	14.4	2.1
Hispanic	13	22.0	0.3	13	19.6	0.3	25	23.1	0.5	37	32	0.8	32	28.8	0.7
White	30	50.8	1.0	32	48.4	1.1	41	38	1.4	47	40.5	1.6	49	44.1	1.8
Other	0	0.0	0.0	0	0.0	0.0	2	2.0	0.0	2	1.7	--	5	4.5	--
Unknown	0	0.0		0	0.0		0	0.0		2	1.7	--	2	1.8	--
SPA															
1	1	1.7	0.3	0	0	0	2	1.8	0.8	2	1.7	0.5	3	2.7	0.8
2	18	30.5	0.8	14	21.2	0.6	22	20.3	1.0	19	16.3	0.9	21	18.9	1.0
3	9	15.3	0.5	7	10.6	0.4	13	12.0	0.7	15	13	0.9	17	15.3	1.1
4	7	11.9	0.5	9	13.6	0.7	15	13.8	1.2	13	11.2	1.0	13	11.7	1.2
5	8	13.6	1.2	13	19.6	2.0	12	11.1	1.8	8	7.0	1.2	10	9.0	1.6
6	4	6.8	0.4	10	15.1	1.0	12	11.1	1.1	23	19.8	2.2	17	15.3	1.7
7	4	6.8	0.3	8	12.1	0.6	13	12.0	0.9	15	13	1.1	14	12.6	1.1
8	8	13.6	0.7	5	7.5	0.4	16	14.8	0.4	19	16.3	1.7	14	12.6	1.3
Unknown	0	0.0		0	0.0		3	2.7	0.1	2	1.7	0.5	2	1.8	---

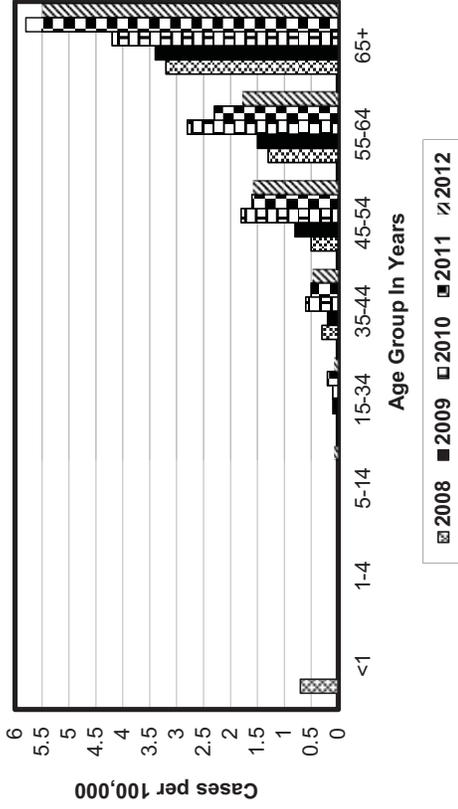
* Rates calculated based on less than 19 cases or events are considered unreliable.



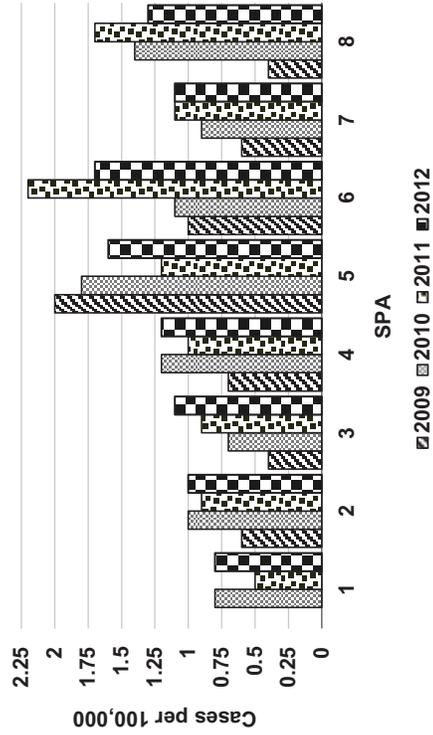
**Figure 1. Incidence Rates of Legionellosis
LAC, CA and US, 2003-2012**



**Figure 2. Incidence Rates of Legionellosis by Age Group
LAC, 2008 - 2012**



**Figure 3. Incidence Rates of Legionellosis by SPA
LAC, 2009-2012**



**Figure 4. Reported Legionellosis Cases by Month of Onset
LAC, 2012 (N=111)**

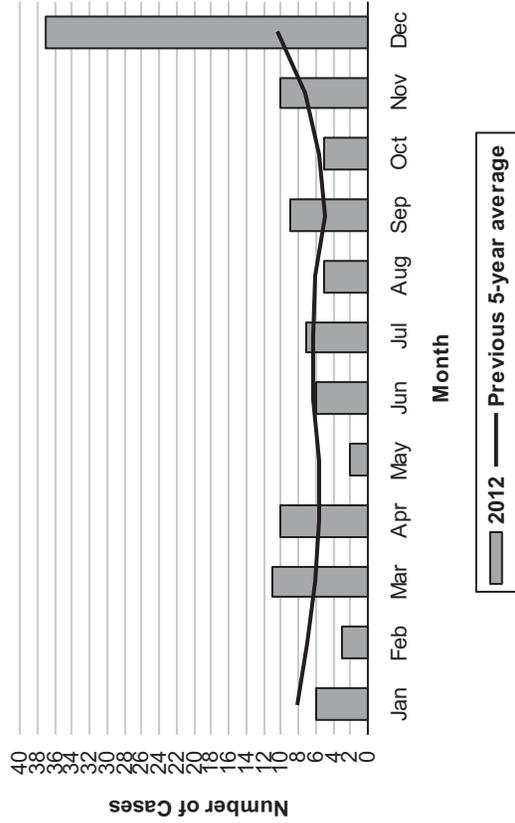
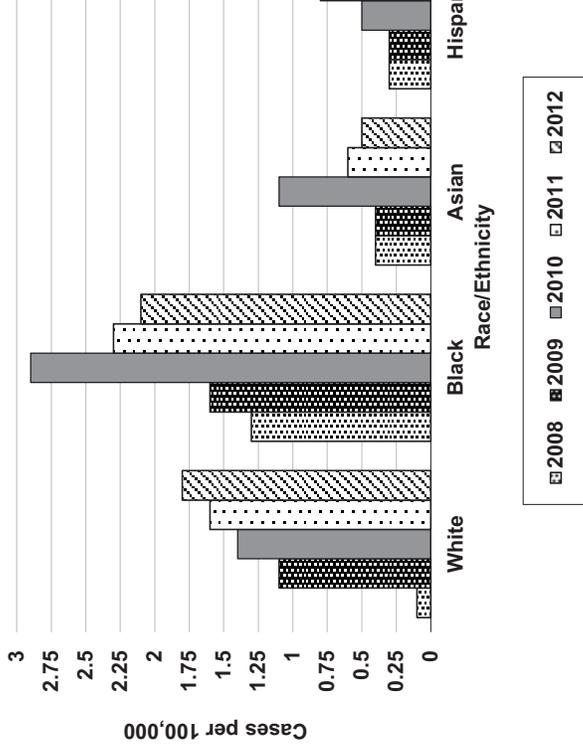
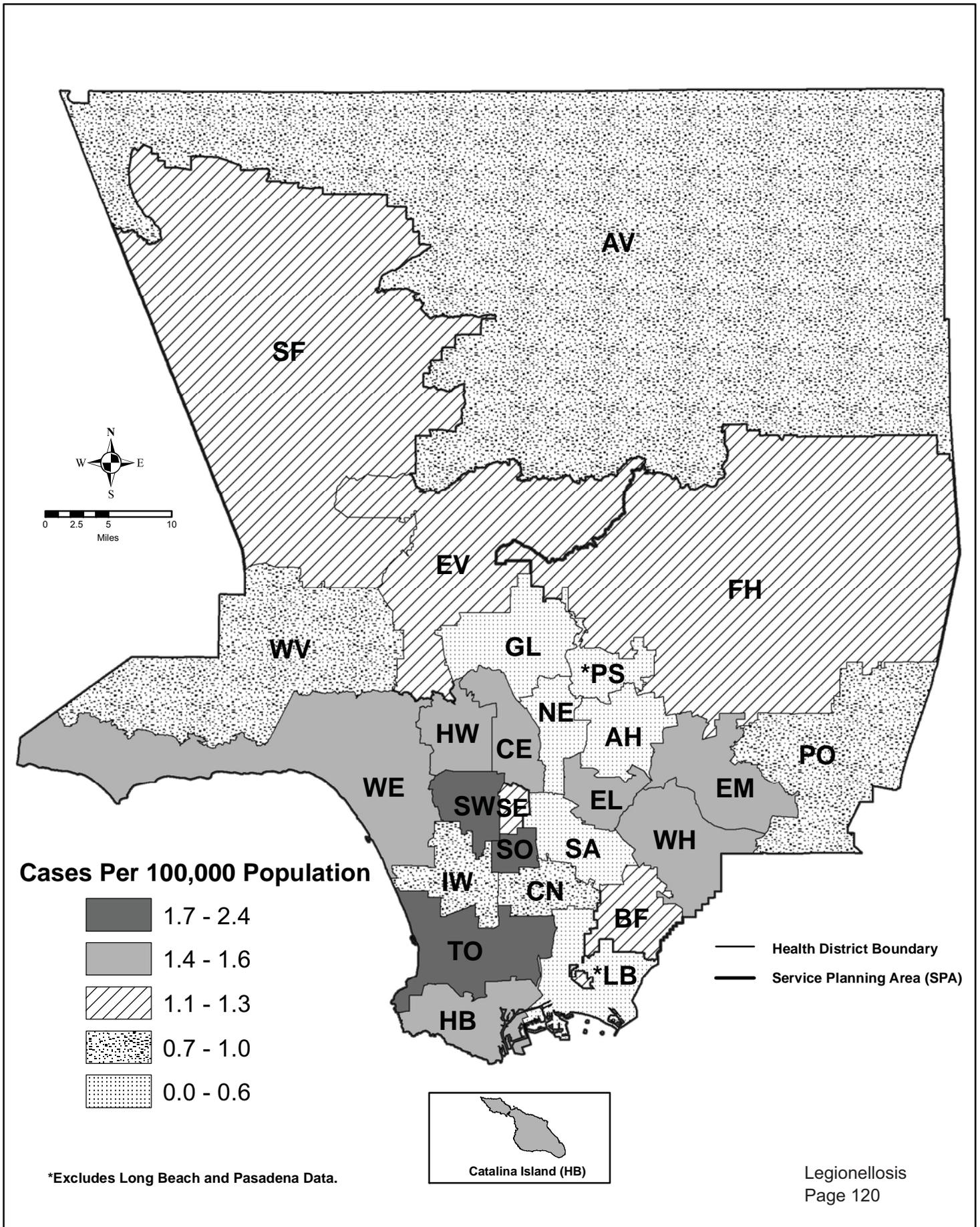




Figure 5. Legionellosis Rates by Race/Ethnicity
LAC, 2008 - 2012



Map 7. Legionellosis Rates by Health District, Los Angeles County, 2012*





LEGIONELLOSIS

CRUDE DATA	
Number of Cases	116
Number of Deaths	18
Annual Incidence ^a	
LA County	1.18
California ^b	0.70
United States ^b	1.35
Age at Diagnosis	
Mean	65.3
Median	65
Range	25-98

^aCases per 100,000 population.

^bCalculated from Final 2011 Reports of Nationally Notifiable Infectious Disease. MMWR 61(32);625-637.

DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute, self-limited flu-like illness without pneumonia. *Legionella* bacteria are common inhabitants of aquatic systems that thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila* serogroup 1, although at least 46 *Legionella* species and 70 serogroups have been identified. Transmission occurs through inhalation of aerosols containing the bacteria or by aspiration of contaminated water. Person-to-person transmission does not occur. The case fatality rate for LD ranges from 10% to 15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects middle-aged and older persons, particularly those who are heavy smokers, have chronic lung disease, or whose immune systems are suppressed by illness or medication.

The implementation of water safety plans to control the risk of transmission of *legionella* to susceptible hosts in hospitals, hotels and public places with water related amenities remains the primary means of reducing LD. Plans include periodic inspection of water sources, distribution systems, heat exchangers, and cooling towers. Prevention strategies include appropriate disinfection, monitoring, and maintenance of both cold and hot water systems, and setting the hot

water temperature to 50 degrees Celsius or higher to limit bacterial growth. All healthcare-acquired LD case reports are investigated to identify potential outbreak situations. Early recognition and investigation is crucial for timely implementation of control measures.

2011 TRENDS AND HIGHLIGHTS

- Four cases of Pontiac fever were reported.
- The case fatality rate increased from 5.5% in 2010 to 15.5% in 2011.
- The most affected age group in Los Angeles county (LAC) was persons 65 years of age and older. Over the past few years there has also been a consistent upward trend in the incidence rates among the younger population (Figure 2).
- Service Planning Area (SPA) 6 had the highest incidence this year followed by SPA 5 who overall sustained the highest incidence since 2007 (Figure 3).
- The highest incidence rate occurred among blacks (2.3 per 100,000) followed by whites (1.6 per 100,000). Rates in all race categories have risen steadily since 2007 (Figure 5). Analysis demonstrated no geographic clustering by race (though number of cases was small).
- People staying overnight in hotels during the incubation period accounted for 3.4% of confirmed cases, a decrease from 7% in 2010. According to the CDC, more than 20% of all LD cases reported are associated with recent travel. No LAC resident was linked to any CDC reports of legionellosis found nationwide.
- Nosocomial legionellosis cases associated with skilled nursing facilities increased from 1.8% to 3.4% and from 3.7 % to 4.3% in retirement assisted living facilities. Investigation and active case finding found two outbreaks with one fatality in each setting. 6.8% of nosocomial legionella pneumonia occurred in acute care facilities which prompted two epidemiologic investigations, enhanced surveillance, and retrospective case finding. No additional cases were found with active surveillance at the two hospitals in the specified period.
- A lung transplant recipient was identified as a confirmed case. After an extensive review of donor records and consultation with CDC and California Department of Public Health, source of exposure of the case was not determined.



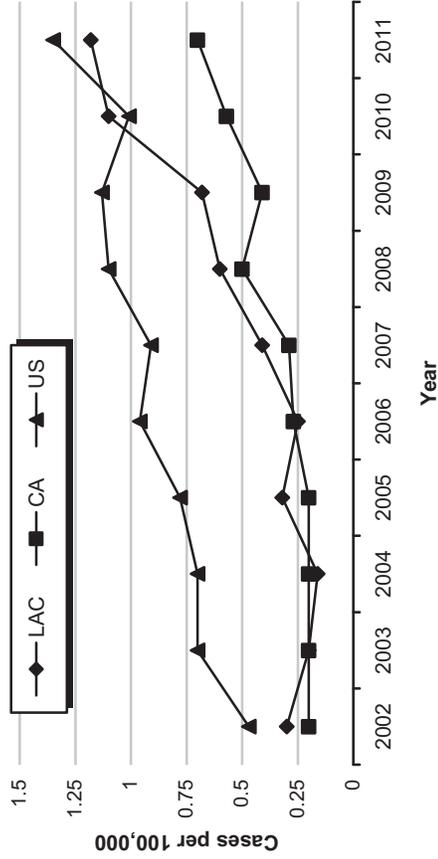
**Reported Legionellosis Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2007-2011**

Age Group	2007 (N=40)			2008 (N=59)			2009 (N=66)			2010 (N=108)			2011 (N=116)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
<1	0	0.0	0.0	0	0.0	0.0	1	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	--	--
5-14	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	--	--
15-34	2	5.0	0.1	1	1.7	0.0	2	3.0	0.1	3	3.0	0.1	5	4.0	0.2
35-44	4	10	0.3	5	8.5	0.3	3	4.5	0.2	9	8.0	0.6	7	6.0	0.5
45-54	10	25	0.8	7	11.9	0.5	11	16.6	0.8	25	23	1.8	21	18	1.6
55-64	5	12.5	0.6	12	20.3	1.3	14	21.2	1.5	27	25.0	2.8	22	19	2.3
65+	19	47.5	1.9	33	55.9	3.2	36	54.5	3.4	44	41	4.2	61	53	5.8
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0		
Race/Ethnicity															
Asian	0	0.0	0.5	5	8.5	0.4	7	10.6	0.5	15	14.0	1.1	8	7.0	0.6
Black	6	15.0	0.7	11	18.6	1.3	14	21.2	1.6	25	23.1	2.9	20	17.2	2.3
Hispanic	5	30.0	0.3	13	22.0	0.3	13	19.6	0.3	25	23.1	0.5	37	32	0.8
White	10	55.0	0.8	30	50.8	1.0	32	48.4	1.1	41	38	1.4	47	40.5	1.6
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	2	2.0	0.0	2	1.7	--
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		2	1.7	--
SPA															
1	0	0.0	0.0	1	1.7	0.3	0	0	0	2	1.8	0.8	2	1.7	0.5
2	8	20.0	0.4	18	30.5	0.8	14	21.2	0.6	22	20.3	1.0	19	16.3	0.9
3	6	15.0	0.3	9	15.3	0.5	7	10.6	0.4	13	12.0	0.7	15	13	0.9
4	7	17.5	0.6	7	11.9	0.5	9	13.6	0.7	15	13.8	1.2	13	11.2	1.0
5	7	17.5	1.1	8	13.6	1.2	13	19.6	2.0	12	11.1	1.8	8	7.0	1.2
6	7	17.5	0.7	4	6.8	0.4	10	15.1	1.0	12	11.1	1.1	23	19.8	2.2
7	4	10.0	0.3	4	6.8	0.3	8	12.1	0.6	13	12.0	0.9	15	13	1.1
8	1	2.5	0.1	8	13.6	0.7	5	7.5	0.4	16	14.8	0.4	19	16.3	1.7
Unknown	0			0	0.0		0	0.0		3	2.7	0.1	2	1.7	0.5

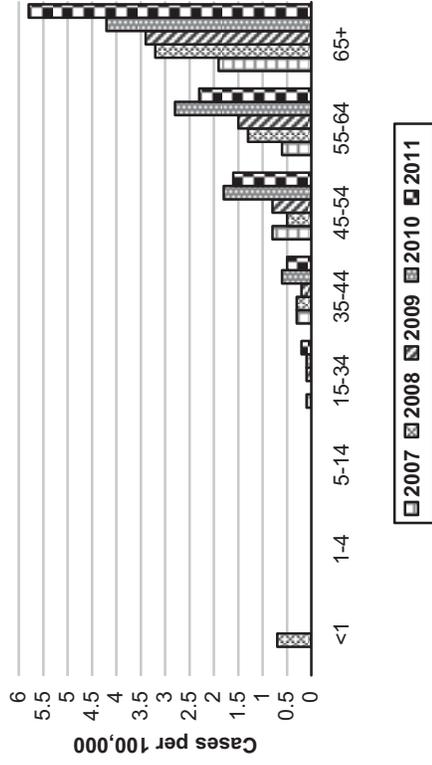
*Rates calculated based on less than 19 cases or events are considered unreliable.



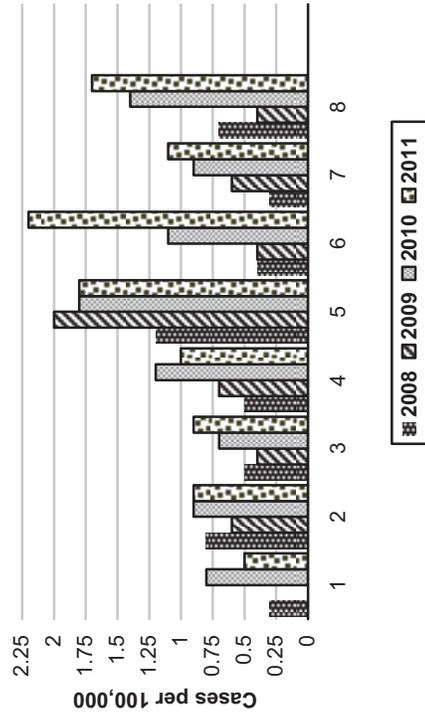
**Figure 1. Incidence Rates of Legionellosis
LAC, CA and US, 2002-2011**



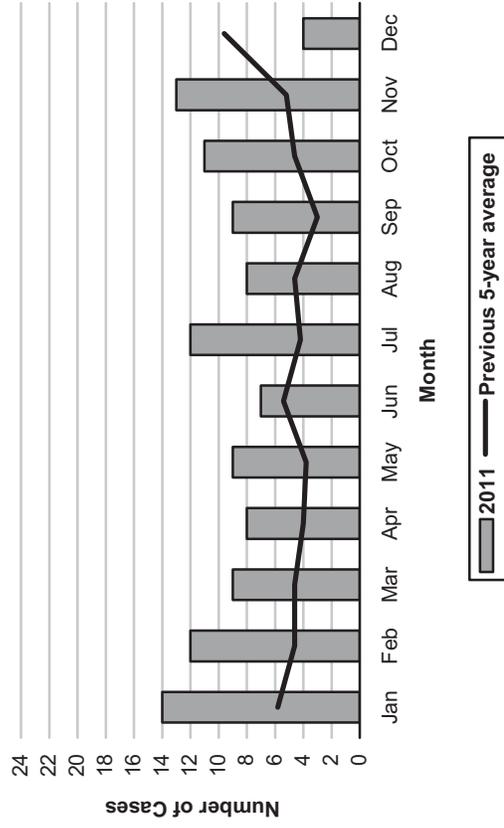
**Figure 2. Incidence Rates of Legionellosis by Age Group
LAC, 2007-2011**



**Figure 3. Incidence Rates of Legionellosis by SPA
LAC, 2008-2011**

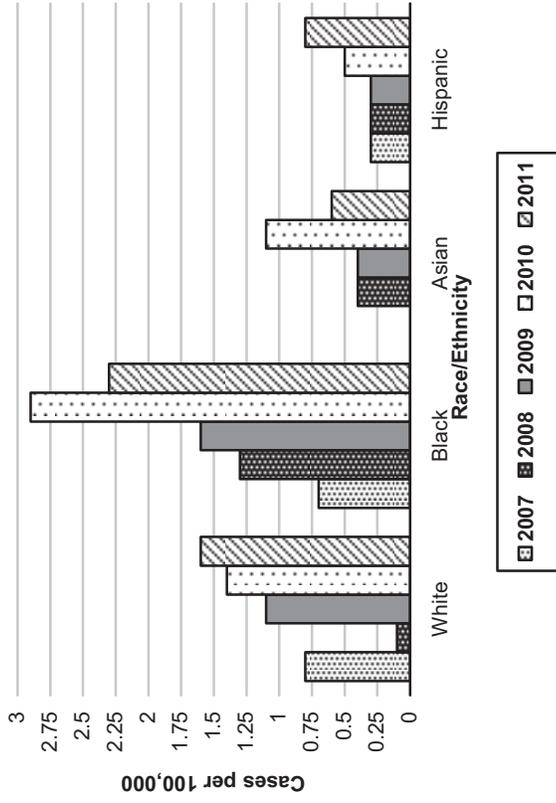


**Figure 4. Reported Legionellosis Cases by Month of Onset
LAC, 2011 (N=116)**

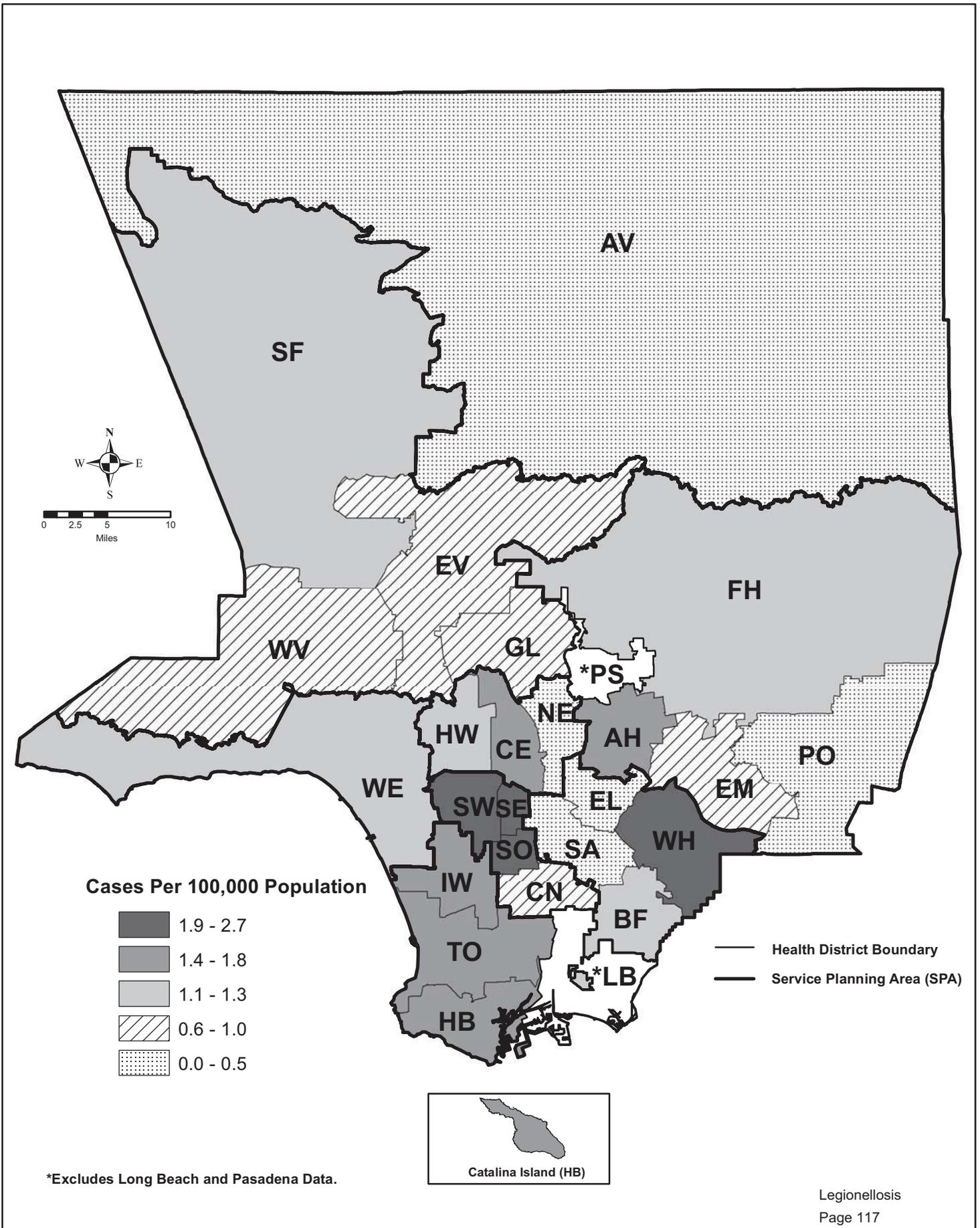




**Figure 5. Legionellosis Rates by Race/Ethnicity
LAC, 2007-2011**



Map 9. Legionellosis Rates by Health District, Los Angeles County, 2011*







LEGIONELLOSIS

CRUDE DATA	
Number of Cases	108
Number of Deaths	6
Annual Incidence ^a	
LA County	0.68
California ^b	--
United States ^b	--
Age at Diagnosis	
Mean	61.65
Median	60
Range	20-94

^aCases per 100,000 population.

^bSee Final Summary of Nationally Notifiable Infectious Diseases, United States on MMWR website http://www.cdc.gov/mmwr/mmwr_nd/index.html.

DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute-onset, self-limited flu-like illness without pneumonia. *Legionella* bacteria are common inhabitants of aquatic systems that thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila* serogroup 1, although at least 46 *Legionella* species and 70 serogroups have been identified. Transmission occurs through inhalation of aerosols containing the bacteria or by aspiration of contaminated water. Person-to-person transmission does not occur. The case fatality rate for LD ranges from 10% to 15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects middle-aged and older persons, particularly those who are heavy smokers, have chronic lung disease, or whose immune systems are suppressed by illness or medication.

The implementation of water safety plans to control the risk of transmission of *legionella* to susceptible hosts in hospitals, hotels and public places with water related amenities remains the primary means of reducing LD. Plans include periodic inspection of water source, distribution systems, heat exchangers, and cooling towers. Prevention strategies include appropriate disinfection, monitoring and maintenance of both cold and hot water systems, and setting the hot

water temperature to 50 degrees Celsius or higher to limit bacterial growth. All healthcare-acquired LD case reports are investigated to identify potential outbreak situations. Early recognition and investigation is crucial for timely implementation of control measures.

2010 TRENDS AND HIGHLIGHTS

- Two cases of Pontiac fever were reported.
- The case fatality rate increased from 4.5% in 2009 to 5.5% in 2010.
- The most affected age group in LAC is persons 65 years of age and older. Over the past few years there has also been a consistent upward trend in the incidence rates among the younger population (Figure 2).
- Service Planning Area (SPA) 5 sustained the highest incidence of any SPA since 2007 (Figure 3).
- The highest incidence rate occurred among blacks (2.9 per 100,000) followed by whites (1.4 per 100,000). Rates in all race categories have risen steadily since 2006 (Figure 5). Analysis demonstrated no geo-clustering by race (though number of cases was small).
- People staying overnight in hotels during the incubation period accounted for approximately 7% of confirmed cases, an increase from 3% in 2009. According to the CDC, more than 20% of all LD cases reported are associated with recent travel. LAC investigated two cases a year apart who stayed in the same hotel during their respective incubation periods. No additional cases were found and no legionella bacteria was recovered from the environment after a thorough investigation.
- Two LAC cases that occurred six months apart were linked to an out-of-state hotel casino outbreak investigation from 2009-2010. Active case finding found no additional LAC residents linked to this particular outbreak.
- Many single legionella cases were associated with a variety of public settings, including a skilled nursing facility, assisted living facilities, fitness centers, a college campus, an office workplace, and dental offices. ACDC investigated each of these settings but no additional cases were found after enhanced surveillance and retrospective case finding.



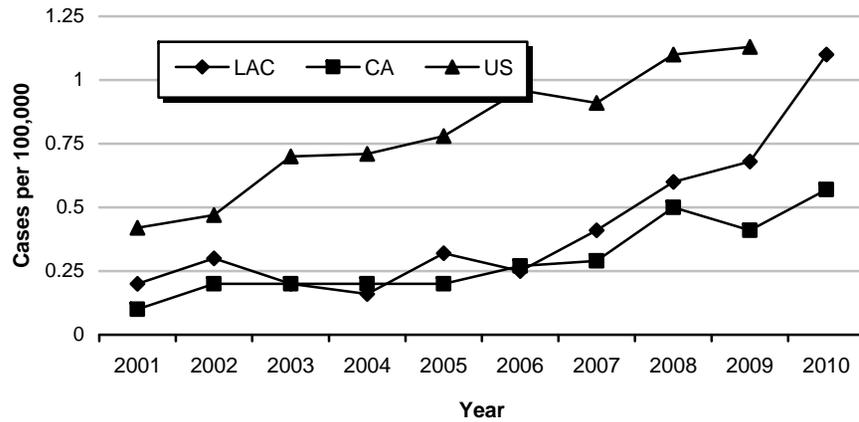
**Reported Legionellosis Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2006-2010**

	2006 (N=24)			2007 (N=40)			2008 (N=59)			2009 (N=66)			2010 (N=108)		
	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	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		
5-14	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0		
15-34		4.2	0.0	2	5.0	0.1	1	1.7	0.0	2	3.0	0.1	3	3.0	0.1
35-44	2	8.3	0.1	4	10	0.3	5	8.5	0.3	3	4.5	0.2	9	8.0	0.6
45-54	2	8.3	0.2	10	25	0.8	7	11.9	0.5	11	16.6	0.8	25	23.0	1.8
55-64	5	20.8	0.6	5	12.5	0.6	12	20.3	1.3	14	21.2	1.5	27	25.0	2.8
65+	14	58.3	1.4	19	47.5	1.9	33	55.9	3.2	36	54.5	3.4	44	41.0	4.2
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0		
Race/Ethnicity															
Asian	6	25.0	0.5	0	0.0	0.0	5	8.5	0.4	7	10.6	0.5	15	14.0	1.1
Black	3	12.5	0.4	6	15.0	0.7	11	18.6	1.3	14	21.2	1.6	25	23.1	2.9
Hispanic	5	20.8	0.1	12	30.0	0.3	13	22.0	0.3	13	19.6	0.3	25	23.1	0.5
White	10	41.7	0.3	22	55.0	0.8	30	50.8	1.0	32	48.4	1.1	41	38.0	1.4
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	2	2.0	
Unknown	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	1.7	0.3	0	0	0	2	1.8	0.8
2	3	12.5	0.1	8	20.0	0.4	18	30.5	0.8	14	21.2	0.6	22	20.3	1.0
3	4	16.7	0.2	6	15.0	0.3	9	15.3	0.5	7	10.6	0.4	13	12.0	0.7
4	7	29.2	0.6	7	17.5	0.6	7	11.9	0.5	9	13.6	0.7	15	13.8	1.2
5	1	4.2	0.2	7	17.5	1.1	8	13.6	1.2	13	19.6	2.0	12	11.1	1.8
6	0	0.0	0.0	7	17.5	0.7	4	6.8	0.4	10	15.1	1.0	12	11.1	1.1
7	7	29.2	0.5	4	10.0	0.3	4	6.8	0.3	8	12.1	0.6	13	12.0	0.9
8	1	4.2	0.1	1	2.5	0.1	8	13.6	0.7	5	7.5	0.4	16	14.8	1.4
Unknown	1	4.2		0	0.0		0	0.0		0	0.0		3	2.7	0.1

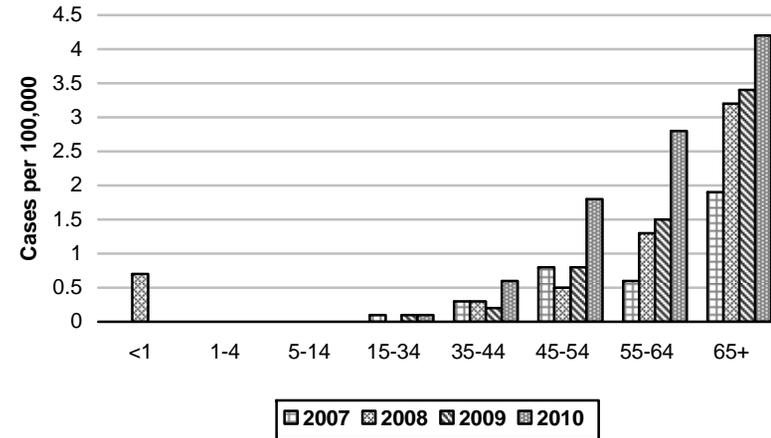
*Rates calculated based on less than 19 cases or events are considered unreliable.



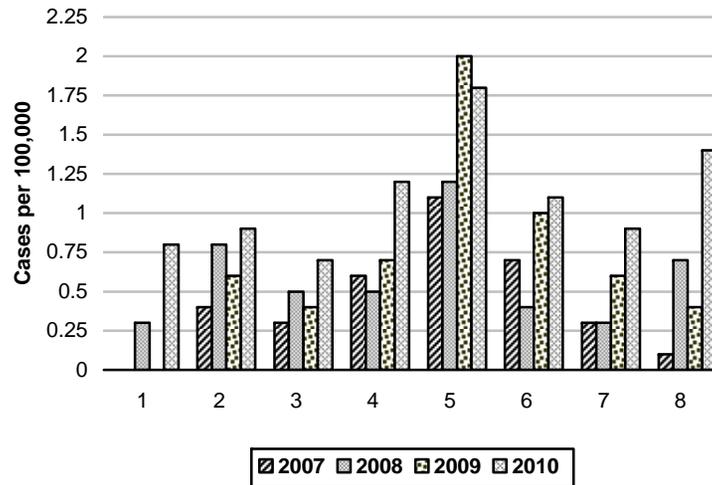
**Figure 1. Incidence Rates of Legionellosis
LAC, CA and US, 2001-2010**



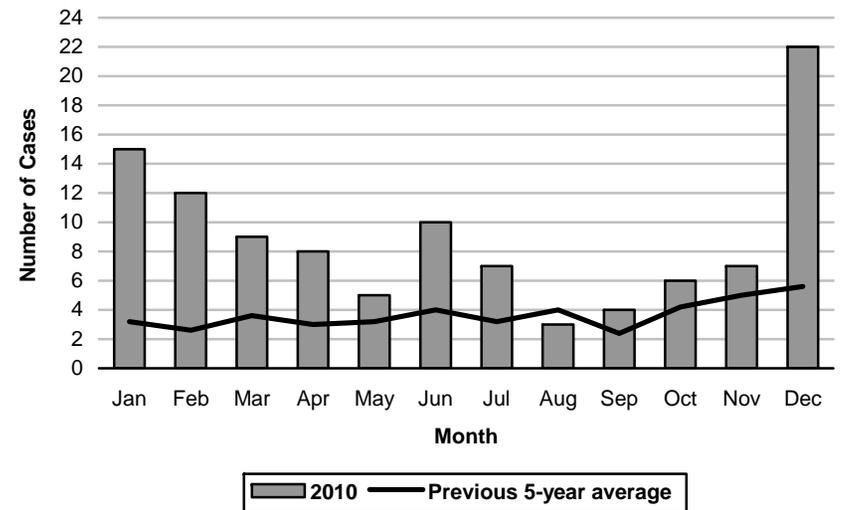
**Figure 2. Incidence Rates of Legionellosis by Age Group
LAC, 2007-2010**



**Figure 3. Incidence Rates of Legionellosis by SPA
LAC, 2007-2010**

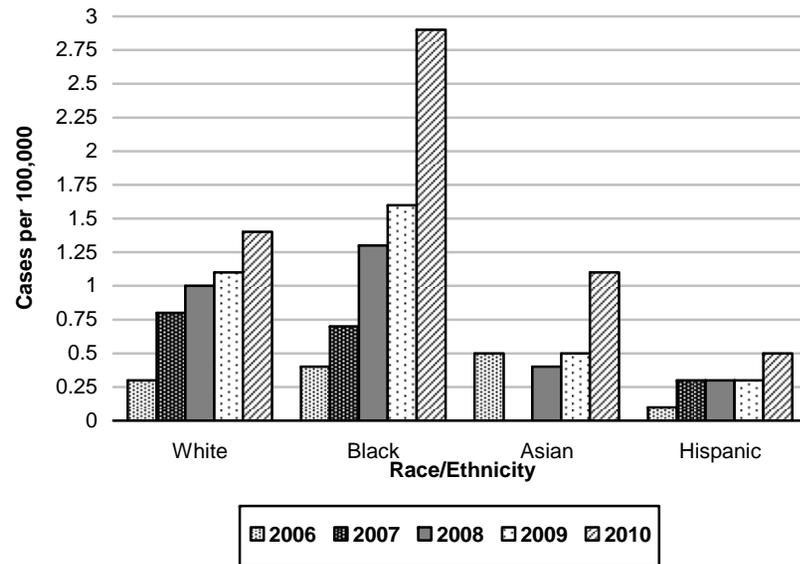


**Figure 4. Reported Legionellosis Cases by Month of Onset
LAC, 2010 (N=108)**





**Figure 5. Legionellosis Rates by Race/Ethnicity
LAC, 2006-2010**





LEGIONELLOSIS

CRUDE DATA	
Number of Cases	66
Number of Deaths	3
Annual Incidence ^a	
LA County	0.68
California ^b	0.5
United States ^b	1.1
Age at Diagnosis	
Mean	65.9
Median	66
Range	32-93

^aCases per 100,000 population.

^bCalculated from Final 2008 Reports of Nationally Notifiable Infectious Disease. MMWR 58(31);856-857;859-869.

DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute-onset, self-limited flu-like illness without pneumonia. *Legionella* bacteria are common inhabitants of aquatic systems that thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila* serogroup 1, although at least 46 *Legionella* species and 70 serogroups have been identified. Transmission occurs through inhalation of aerosols containing the bacteria or by aspiration of contaminated water. Person-to-person transmission does not occur. The case fatality rate for LD ranges from 10% to 15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects middle-aged and older persons, particularly those who are heavy smokers, have chronic lung disease, or whose immune systems are suppressed by illness or medication.

The implementation of water safety plans to control the risk of transmission of *legionella* to susceptible hosts in hospitals, hotels and public places with water related amenities remains the primary means of reducing LD. Plans include inspection of water source, distribution systems, and heat exchanger and cooling towers. Prevention strategies include instituting periodic disinfection, monitor/maintain cold and hot water systems, and setting temperatures to 50 degrees Celsius or higher to limit bacterial growth.

Surveillance of LD is essential to monitor disease incidence. All healthcare acquired LD are investigated to determine outbreak situations. Early recognition and investigation is crucial for timely implementation of control measures.

2009 TRENDS AND HIGHLIGHTS

- LD incident rates continue to increase (Figure 1). Expanded electronic laboratory reporting and web-based confidential morbidity reporting may explain the increase since 2007.
- Most utilized method of diagnosis is by urine antigen, which is highly specific for *L. pneumophila* serogroup 1a, so other serogroups or species will not be detected. Culture confirmation is encouraged and will allow for strain typing during outbreaks.
- Four cases of Pontiac fever were reported.
- In 2009, an unusual number of LD occurrences led to enhanced surveillance, case finding and environmental investigations.
- The identification of two or more cases from a single exposure site within a six month period prompted three epidemiologic investigations: two different skilled nursing facilities (SNF) and a local fitness center (see 2009 ACDC Special Studies). Enhanced surveillance, retrospective case finding, and environmental inspection and sampling were performed. No additional cases were found, and no *legionella* bacteria were identified from the environment in any of these investigations.
- The case fatality rate has decreased from 10.2% in 2008 to 4.5% in 2009. A history of recent travel was reported in 3.0% of cases.
- Most affected age group in LAC is 65 and up (Figure 2)
- Service Planning Area (SPA) 5 sustained the high incidence since 2008 (2.0 per 100,000) followed by SPA 6 (1.0 per 100,000) (Figure 3).
- LAC cases were distributed throughout the year, with peak months being August-December. Current surveillance peaked in December as compared to August in 2008. (Figure 4).
- The highest incidence rate of cases occurred among blacks (1.6 per 100,000) followed by whites (1.1 per 100,000) (Figure 5).



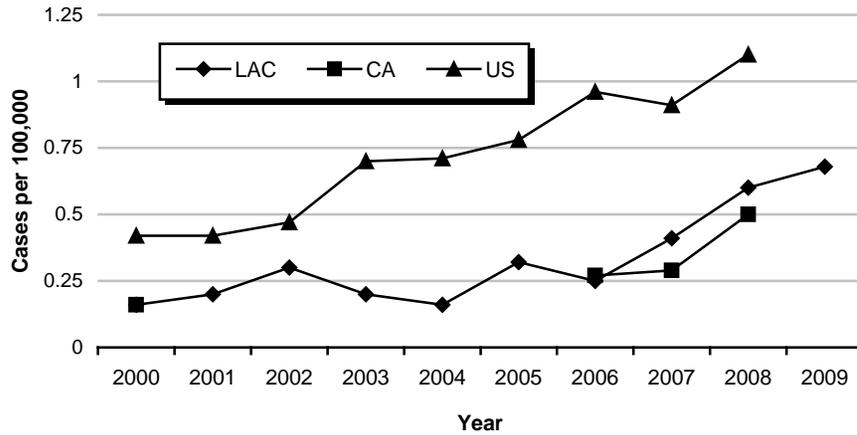
**Reported Legionellosis Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
 Los Angeles County, 2005-2009**

	2005 (N=31)			2006 (N=24)			2007 (N=40)			2008 (N=59)			2009 (N=66)		
	No.	(%)	Rate/ 100,000												
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	1.7	0.7	0		
1-4	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		
15-34	0	0.0	0.0	1	4.2	0.0	2	5.0	0.1	1	1.7	0.0	2	3.0	0.1
35-44	3	9.7	0.2	2	8.3	0.1	4	10.0	0.3	5	8.5	0.3	3	4.5	0.2
45-54	5	16.1	0.4	2	8.3	0.2	10	25.0	0.8	7	11.9	0.5	11	16.6	0.8
55-64	10	32.3	1.2	5	20.8	0.6	5	12.5	0.6	12	20.3	1.3	14	21.2	1.5
65+	13	41.9	1.3	14	58.3	1.4	19	47.5	1.9	33	55.9	3.2	36	54.5	3.4
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0		
Race/Ethnicity															
Asian	7	22.6	0.6	6	25.0	0.5	0	0.0	0.0	5	8.5	0.4	7	10.6	0.5
Black	2	6.5	0.2	3	12.5	0.4	6	15.0	0.7	11	18.6	1.3	14	21.2	1.6
Hispanic	10	32.3	0.2	5	20.8	0.1	12	30.0	0.3	13	22.0	0.3	13	19.6	0.3
White	12	38.7	0.4	10	41.7	0.3	22	55.0	0.8	30	50.8	1.0	32	48.4	1.1
Other	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	0	0.0	0.0	1	1.7	0.3	0	0	0
2	4	12.9	0.2	3	12.5	0.1	8	20.0	0.4	18	30.5	0.8	14	21.2	0.6
3	6	19.4	0.4	4	16.7	0.2	6	15.0	0.3	9	15.3	0.5	7	10.6	0.4
4	1	3.2	0.1	7	29.2	0.6	7	17.5	0.6	7	11.9	0.5	9	13.6	0.7
5	1	3.2	0.2	1	4.2	0.2	7	17.5	1.1	8	13.6	1.2	13	19.6	2.0
6	2	6.5	0.2	0	0.0	0.0	7	17.5	0.7	4	6.8	0.4	10	15.1	1.0
7	6	19.4	0.4	7	29.2	0.5	4	10.0	0.3	4	6.8	0.3	8	12.1	0.6
8	1	3.2	0.1	1	4.2	0.1	1	2.5	0.1	8	13.6	0.7	5	7.5	0.4
Unknown	10	32.3		1	4.2		0	0.0		0	0.0				

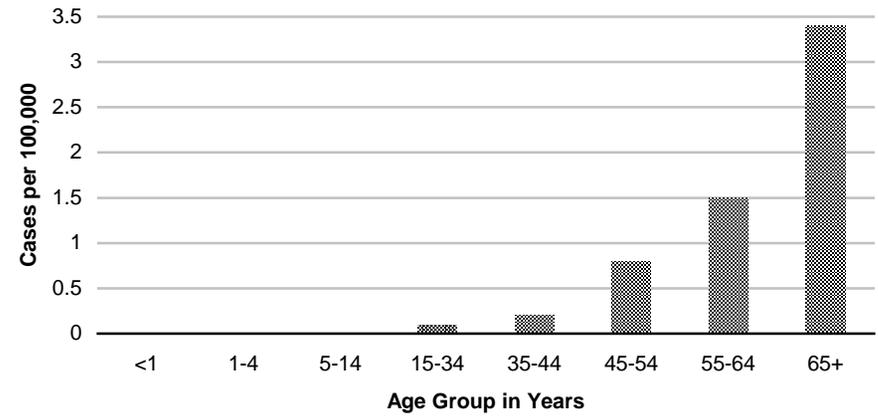
*Rates calculated based on less than 19 cases or events are considered unreliable.



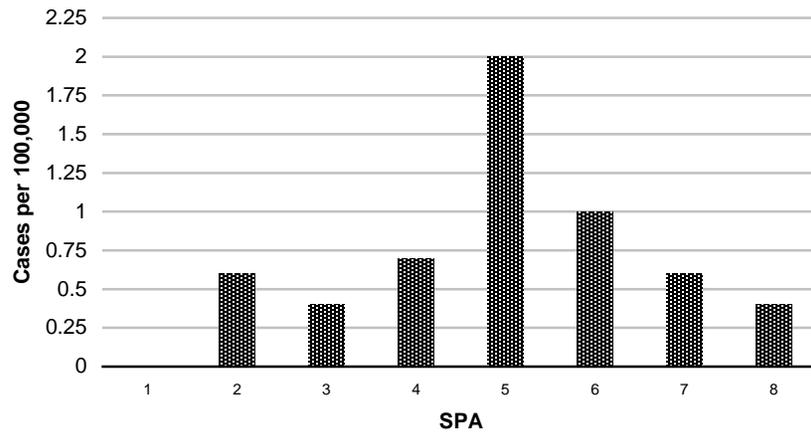
**Figure 1. Incidence Rates of Legionellosis
LAC, CA and US, 2000-2009**



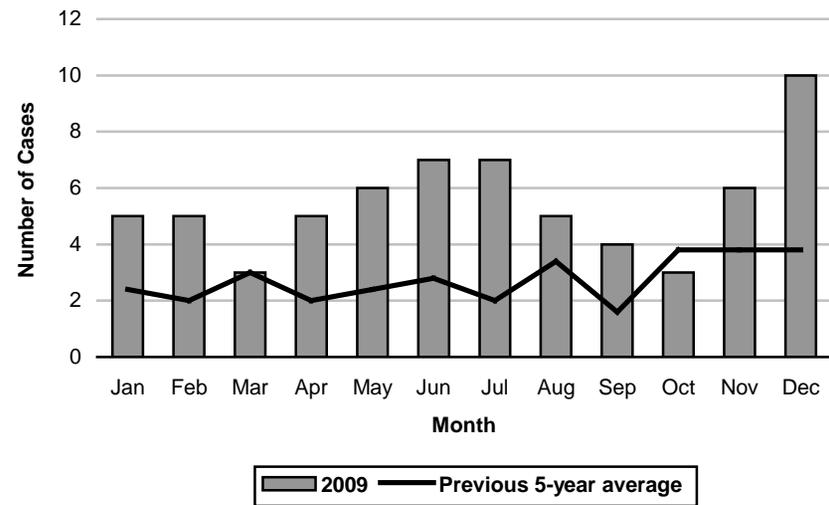
**Figure 2. Incidence Rates of Legionellosis by Age Group
LAC, 2009 (N=66)**



**Figure 3. Incidence Rates of Legionellosis by SPA
LAC, 2009 (N=66)**

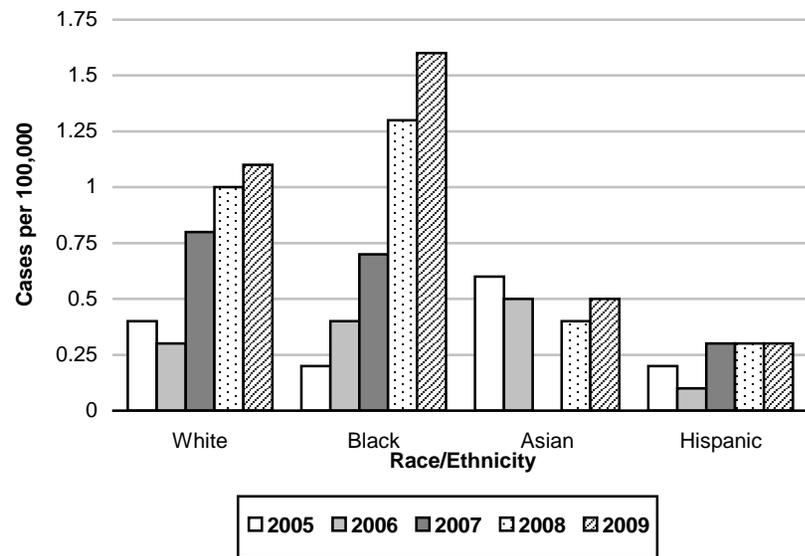


**Figure 4. Reported Legionellosis Cases by Month of Onset
LAC, 2009 (N=66)**

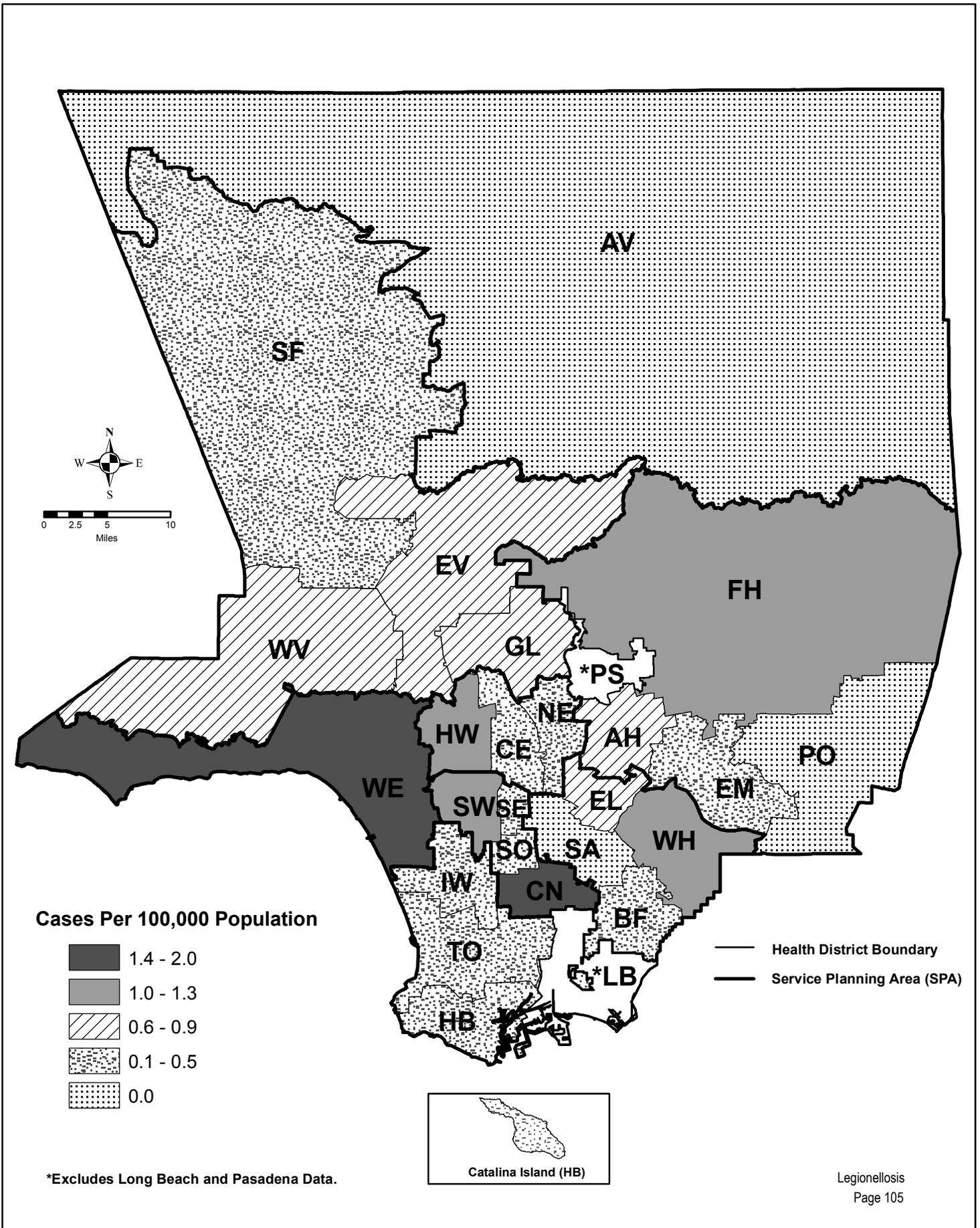




**Figure 5. Legionellosis Rates by Race/Ethnicity
LAC, 2005-2009**



Map 8. Legionellosis Rates by Health District, Los Angeles County, 2009*





LEGIONELLOSIS

CRUDE DATA	
Number of Cases	59
Number of Deaths	6
Annual Incidence ^a	
LA County	0.6
California ^b	0.5
United States ^b	1.1
Age at Diagnosis	
Mean	64
Median	66
Range	0-89

^aCases per 100,000 population.

^bCalculated from Final 2008 Reports of Nationally Notifiable Infectious Disease. MMWR 58(31);856-857;859-869.

DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute-onset, self-limited flu-like illness without pneumonia. Legionella bacteria are common inhabitants of aquatic systems that thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila serogroup 1*, although at least 46 Legionella species and 70 serogroups have been identified. Transmission occurs through inhalation of aerosols containing the bacteria or by aspiration of contaminated water. Person-to-person transmission does not occur. The case fatality rate for LD ranges from 10% to 15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects middle-aged and older persons, particularly those who are heavy smokers, have chronic lung disease, or whose immune systems are suppressed by illness or medication.

At the community level, there is very little that can be done to prevent sporadic cases of LD. While prevention of LD is impractical at the community level, much has been written about preventive measures in hospitals. Instituting a routine, periodic culturing of the water system, cleaning contaminated water sources

such as cooling towers, water pipes. Application of biocides to limit the growth of organism, maintaining hot water system temperatures at 50 degrees centigrade or higher may reduce the risk of transmission. Using tap water in respiratory devices and procedures should be avoided as well. Surveillance of LD is vital in order to monitor disease incidence and to recognize outbreaks. Prevention of additional cases during outbreaks by early recognition and investigation is of high priority; in order for the control measures may be applied in a timely fashion.

2008 TRENDS AND HIGHLIGHTS

- There was an increase of cases during the last two years; however, LAC rates are lower than the national average (Figure 1). CA rates during the last ten years are not available. No nosocomial cases were reported this year. The case fatality rate has decreased from 12.5% in 2007 to 10.2% in 2008. A history of recent travel was reported in 11.8% of cases.
- Historically, cases in younger groups are relatively uncommon. One case of a <1 year old was reported this year. According to the CDC, from 1994 to 1997, the average number of cases reported in this age group nationally is 1% of the total population. Rates in LAC are similar to US rates with the highest rates occurring in persons greater than 65 years old (Figure 2).
- The highest incidence rates occurred in Service Planning Area (SPA) 5 (1.2 per 100,000) followed by SPA 2 (0.8 per 100,000) (Figure 3). There was no clustering of cases identified in these SPAs.
- In 2008, the number of reported cases in LAC was significantly higher than the five-year average. Cases were distributed throughout the year, with a peak reported during summer, which is consistent with CDC national surveillance data (Figure 4). The increase can be explained due to improved reporting mechanisms such as electronic laboratory reporting and web-based confidential morbidity reporting.
- The majority of cases occurred among whites (30, 50.8%), which was more than twice the number of cases reported Hispanics (13, 22.0%). This data is consistent with the last couple of years (Figure 5).



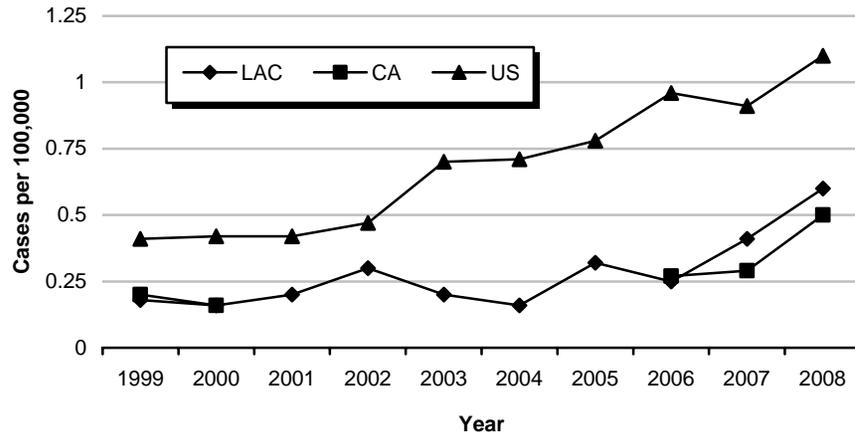
**Reported Legionellosis Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2004-2008**

	2004 (N=15)			2005 (N=31)			2006 (N=24)			2007 (N=40)			2008 (N=59)		
	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	1	1.7	0.7
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	0	0.0	0.0	0	0.0	0.0	1	4.2	0.0	2	5.0	0.1	1	1.7	0.0
35-44	2	13.3	0.1	3	9.7	0.2	2	8.3	0.1	4	10.0	0.3	5	8.5	0.3
45-54	2	13.3	0.2	5	16.1	0.4	2	8.3	0.2	10	25.0	0.8	7	11.9	0.5
55-64	4	26.7	0.5	10	32.3	1.2	5	20.8	0.6	5	12.5	0.6	12	20.3	1.3
65+	5	33.3	0.5	13	41.9	1.3	14	58.3	1.4	19	47.5	1.9	33	55.9	3.2
Unknown	2	13.3		0	0.0		0	0.0		0	0.0		0	0.0	
Race/Ethnicity															
Asian	1	6.7	0.1	7	22.6	0.6	6	25.0	0.5	0	0.0	0.0	5	8.5	0.4
Black	1	6.7	0.1	2	6.5	0.2	3	12.5	0.4	6	15.0	0.7	11	18.6	1.3
Hispanic	5	33.3	0.1	10	32.3	0.2	5	20.8	0.1	12	30.0	0.3	13	22.0	0.3
White	3	20.0	0.1	12	38.7	0.4	10	41.7	0.3	22	55.0	0.8	30	50.8	1.0
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	5	33.3		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	1	1.7	0.3
2	4	26.7	0.2	4	12.9	0.2	3	12.5	0.1	8	20.0	0.4	18	30.5	0.8
3	4	26.7	0.2	6	19.4	0.4	4	16.7	0.2	6	15.0	0.3	9	15.3	0.5
4	1	6.7	0.1	1	3.2	0.1	7	29.2	0.6	7	17.5	0.6	7	11.9	0.5
5	2	13.3	0.3	1	3.2	0.2	1	4.2	0.2	7	17.5	1.1	8	13.6	1.2
6	1	6.7	0.1	2	6.5	0.2	0	0.0	0.0	7	17.5	0.7	4	6.8	0.4
7	2	13.3	0.1	6	19.4	0.4	7	29.2	0.5	4	10.0	0.3	4	6.8	0.3
8	1	6.7	0.1	1	3.2	0.1	1	4.2	0.1	1	2.5	0.1	8	13.6	0.7
Unknown	0	0.0		10	32.3		1	4.2		0	0.0		0	0.0	

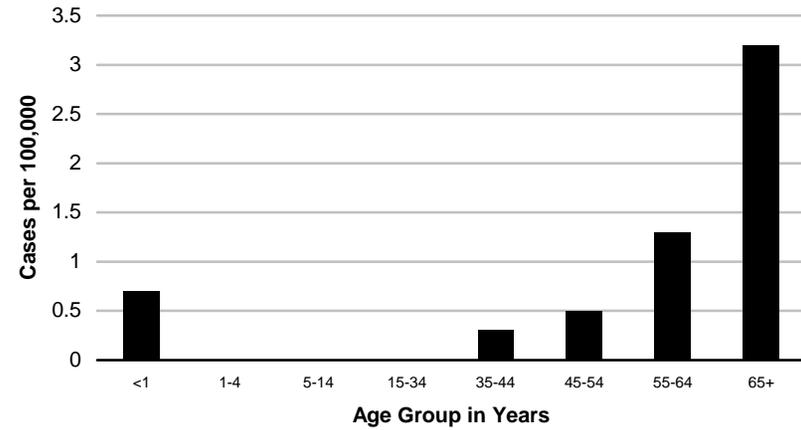
*Rates calculated based on less than 19 cases or events are considered unreliable.



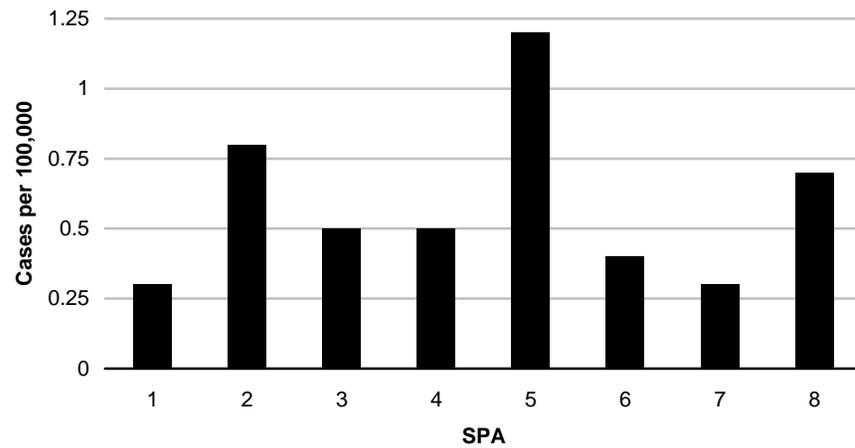
**Figure 1. Incidence Rates of Legionellosis
LAC, CA and US, 1999-2008**



**Figure 2. Incidence Rates of Legionellosis by Age Group
LAC, 2008**



**Figure 3. Incidence Rates of Legionellosis by SPA
LAC, 2008**



**Figure 4. Reported Legionellosis Cases by Month of Onset
LAC, 2008**

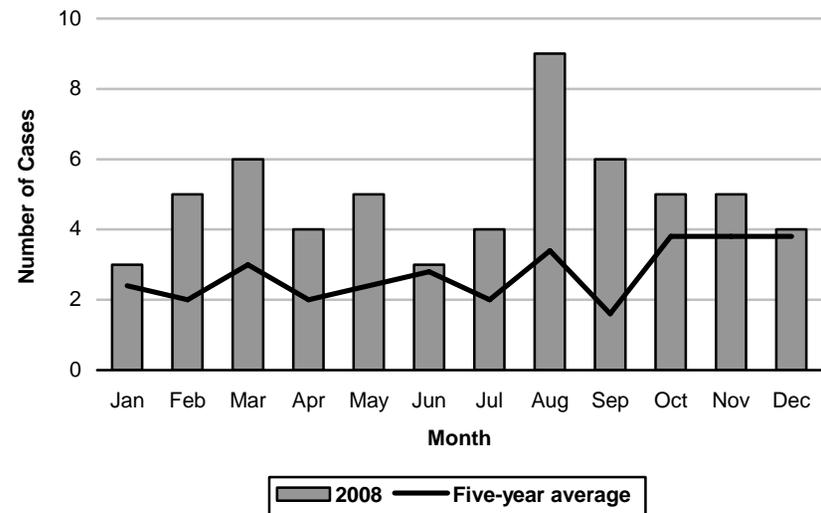
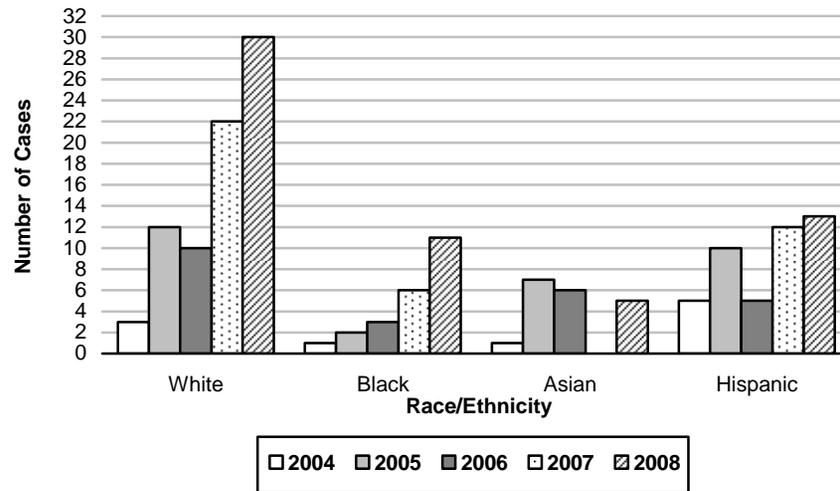
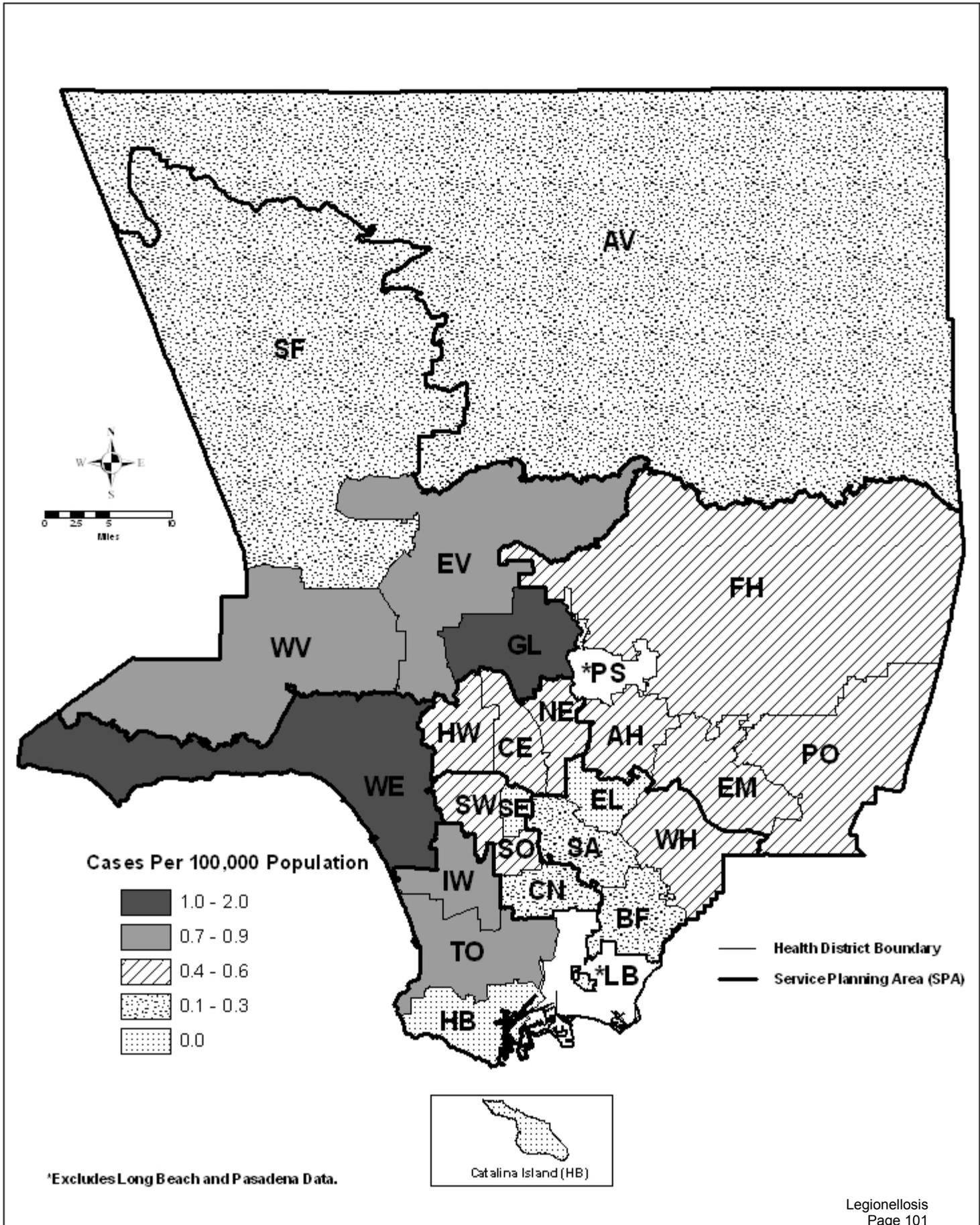




Figure 5. Legionellosis Incidence by Race/Ethnicity
LAC, 2004-2008



Map 9. Legionellosis Rates by Health District, Los Angeles County, 2008*



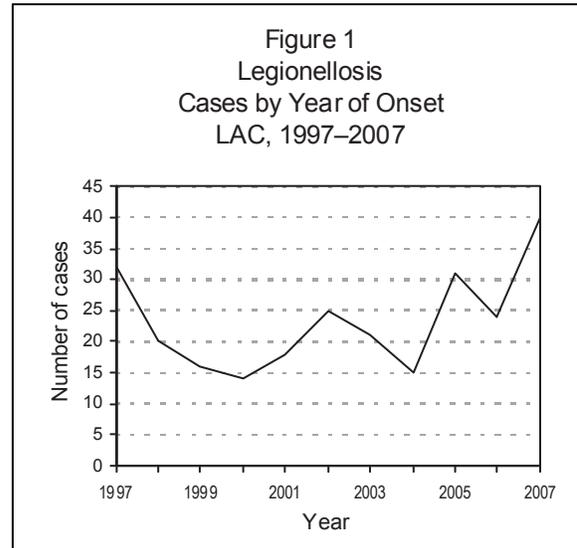


LEGIONELLOSIS

CRUDE DATA	
Number of Cases	40
Annual Incidence ^b	
LA County	0.41
California	0.29 ^a
United States	0.91 ^a
Age at Diagnosis	
Mean	61.7
Median	60
Range	33–93 years

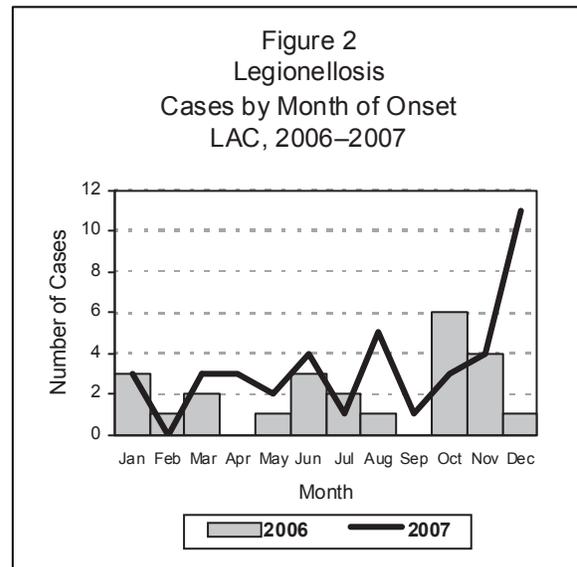
^a Calculated from Final 2007 Reports of Nationally Notifiable Infectious Diseases issue of MMWR (57; 901, 903-913).

^b Cases per 100,000 population.



DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute-onset, self-limited flu-like illness without pneumonia. Legionella bacteria are common inhabitants of aquatic systems that thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila serogroup 1*, although at least 46 Legionella species and 70 serogroups have been identified. Transmission occurs through inhalation of aerosols containing the bacteria and by aspiration of contaminated water. Person-to-person transmission has not been demonstrated. The case fatality rate for LD ranges from 10%–15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects middle-aged and older persons, particularly those who are heavy smokers, have chronic lung disease, or whose immune systems are suppressed by illness or medication.



DISEASE ABSTRACT

- The incidence of legionellosis in LAC is increasing.
- Three unrelated nosocomial cases (1 definite and 2 possible) were reported in 2007.
- No cases of Pontiac fever were reported in 2007.



STRATIFIED DATA

Trends: A total of 40 reported cases met the CDC surveillance case definition for LD in 2007. This is higher than the peak incidence of 32 cases reported in 2005 and likewise in 1997, in which a community outbreak occurred (Figure 1).

Seasonality: Previous years consistently showed an increase in cases during summer and fall. In 2007, data showed a peak in December.

Age: Consistent with the expected higher frequency among older persons, the mean age of reported cases was 61.7 years, the median age was 60 years, and the age range was 33-93 years.

Fatality: In 2007, the fatality rate increased to 12.5% (5/40) compared to 4% (1/24) in 2006. The average age of expired cases was 73.6 years (range 67-89).

Gender: There were 67.5% (n=27) male cases and 32.5% (n=13) female cases.

Race: More than half of cases 55% (n=22) occurred in whites, which is similar to the previous year. The next highest most reported race group were Hispanics 30% (n= 12), followed by blacks 15% (n=6).

Ethnicity: The majority of cases reported were among non-Hispanics 70% (n=28), as compared to Hispanics 30% (n= 12).

COMMENTS

A confirmed case of Legionella has a compatible clinical history of pneumonia and meets at least one of the following laboratory criteria:

- by culture: isolation of any Legionella organism from respiratory secretions, lung tissue, pleural fluid or other sterile fluid
- by detection of Legionella pneumophila serogroup 1 antigen in urine using validated reagents
- by seroconversion: fourfold or greater rise in specific serum antibody titer to Legionella pneumophila serogroup 1 using validated reagents

A definite nosocomial case occurs if a patient is hospitalized continuously for ≥ 10 days and a possibly nosocomial case occurs if a patient is hospitalized 2-9 days before onset of legionella infection. A confirmed travel-associated case meets at least one of the confirmatory laboratory criteria and a history of spending at least one night away from home, or travel to destinations outside their state residence or abroad, in the ten days before onset of illness.

In 2007, there were 40 reported cases, as compared to 24 cases in 2006, a 66% higher. There were two changes that may have been contributory to this increase, thereby increasing the number of laboratory reported cases in the winter months.

- In the fall of 2007, laboratories began reporting Legionella after a change in the California State reporting requirements
- In the winter months there was an increase in the number of Electronic Laboratory Reporting (ELR) system reporting laboratories.

In 2007, 82.5% (n=33) LD cases were diagnosed by Legionella urinary antigen, 10% (n=4) by bronchochoalveolar lavage (BAL)/sputum culture, 5% (n=2) by direct fluorescent antibody (DFA) staining, and 2.5% (n=1) by polymerase chain reaction (PCR). No LD cases were diagnosed by serologic antibody titers. The Legionella urinary antigen was the most frequently used method to diagnose LD due to the ease of its use and specificity. This test also facilitates diagnosis, thus, is useful for prompt initiation of treatment by clinicians. However, this test will only screen for Legionella pneumophila serogroup 1, thus it is recommended that a culture is performed to detect infection and improve legionellosis diagnosis. LAC



encourages all providers who suspect a case of nosocomial legionella to include culture for diagnosis so further testing of the isolate may be performed. Serological testing is not commonly used due to its low sensitivity and undetermined reliability and must be paired to fit the CDC definition of Legionellosis. This diagnostic method offers minimal impact to patients for their therapeutic management because seroconversion occurs during the latter course of the infection.

One definite nosocomial LD and two possible nosocomial LD cases were reported in LAC in 2007 by three different medical facilities. Each medical facility conducted eight weeks of prospective active surveillance and six months of retrospective review to detect other possible cases. No additional LD cases were found in either situation.

Outbreaks of LD continue to occur; thus, worldwide surveillance is in full force. The automated Centers for Disease Control and Prevention system that facilitates reporting was utilized in LAC to report six travel related cases this year. These cases were not found to be related to any outbreak.

A common trend towards empirical treatment of community acquired pneumonia upon clinical presentation without diagnostic testing of Legionella can lead to misdiagnosis and could delay appropriate treatment regimens. Most clinicians may understand how to treat Legionnaires disease findings have shown that 80% (n=31) meet the case definition, but do not list legionella as the final diagnosis. Of note, 23% (n=24) out of the 103 licensed acute care facilities in Los Angeles County reported cases and it is not known why one facility may report more frequently than others. Although cases reported is higher this year due to the implementation of automatic laboratory reporting, the speculation of underreporting, which may indicate poor understanding of the disease, still exists in the medical community. For surveillance to be more effective and to help identify future trends of the disease and possible changing epidemiology, clinicians should consider LD as a differential diagnosis in patients who present with atypical or nosocomial pneumonia.

PREVENTION

At the community level, there is very little that can be done to prevent sporadic cases of LD. While prevention of LD is impractical at the community level, much has been written about preventive measures in hospitals. Instituting a routine, periodic culturing of the water system, cleaning contaminated water sources such as cooling towers, water pipes. Application of biocides to limit the growth of organism, maintaining hot water system temperatures at 50 degrees centigrade or higher may reduce the risk of transmission. Using tap water in respiratory devices and procedures should be avoided as well. Surveillance of LD is vital in order to monitor disease incidence and to recognize outbreaks. Prevention of additional cases during outbreaks by early recognition and investigation is of high priority; in order for the control measures may be applied in a timely fashion.

ADDITIONAL RESOURCES

Guidelines:

Centers for Disease Control and Prevention (2003). Guidelines for environmental infection control in health-care facilities: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. *Morbidity and Mortality Weekly Report*, 52(RR10), 1-42. Retrieved September 17, 2008, from the CDC Web site: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5210a1.htm>

Centers for Disease Control and Prevention (2004). Guidelines for preventing health-care associated pneumonia, 2003: recommendations of CDC and the Healthcare Infection Practices Advisory Committee. *Morbidity and Mortality Weekly Report*, 53(RR3), 1-36. Retrieved September 17, 2008, from the CDC Web site: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5303a1.htm>



Los Angeles County Department of Health Services (2001). Legionellosis: taking the mystery out of laboratory diagnosis. *The Public's Health*, 1(3), 4-5. Retrieved September 17, 2008, from the Los Angeles County Department of Public Health Web site:
http://www.lapublichealth.org/wwwfiles/ph/ph/ph/TPH_October_2001.pdf

Squier, C.L., Stout, J.E., & Krsytofiak, S. (2005). A proactive approach to prevention of health care-acquired Legionnaires' disease: the Allegheny County (Pittsburg) experience. *American Journal of Infection Control*, 33(6), 360-367.

State of Maryland, Department of Health and Mental Hygiene (June 2000). *Report of the Maryland scientific working group to study legionella in water systems in healthcare institutions*. Retrieved September 17, 2008, from the Department of Health and Mental Hygiene Web Site:
<http://www.dhmf.state.md.us/html/legionella.htm>

Reviews:

Sabria, M. & Yu, V.L. (2002). Hospital-acquired legionellosis: solutions for a preventable infection. *Lancet Infectious Diseases*, 2(6), 368-373.

Stout, J.E., Yu, V.L. (2003). Hospital-acquired Legionnaires' disease: new developments. *Current Opinion in Infectious Diseases*, 16(4), 337-341.

Selected Articles:

Benin, A.L., Benson, R.F. & Besser, R.E. (2002). Trends in Legionnaires' disease, 1980- 1998: declining mortality and new patterns of diagnosis. *Clinical Infectious Diseases*, 35(9), 1039-1046.

Garbino, J., Bornand, J.E., Uckay, I., Fonseca, S., & Sax, H. (2004). Impact of positive legionella urinary antigen test on patient management and improvement of antibiotic use. *Journal of Clinical Pathology*, 57(12), 1302-1305.

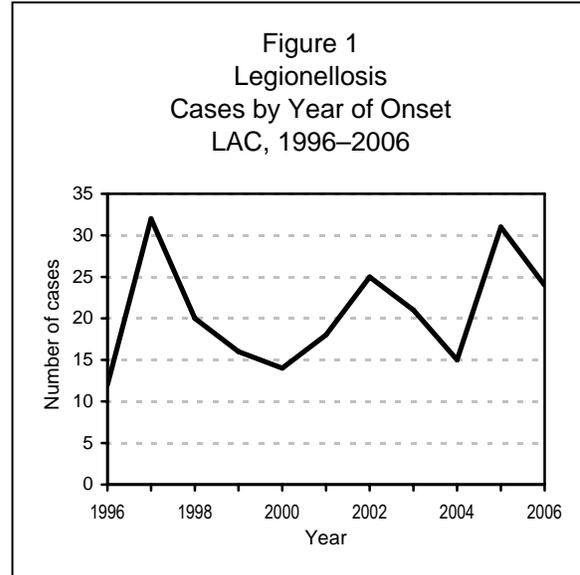
Fields, B.S., Benson, R.F. & Besser, R.E. (2002). Legionella and Legionnaires' disease: 25 years of investigation. *Clinical Microbiology Reviews*, 15(3), 506-526.

Franzin, L., Scolfaro, C., Cabodi, D., Valera, M. & Tovo, P.A. (2001). *Legionella pneumophila* pneumonia in a newborn after water birth: a new mode of transmission. *Clinical Infectious Diseases*, 33(9), e103-104.

LEGIONELLOSIS

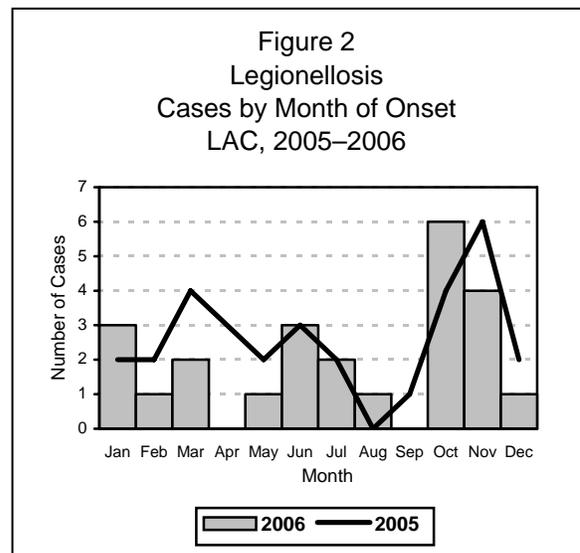
CRUDE DATA	
Number of Cases	24
Annual Incidence	
LA County	0.25
California	0.27 ^a
United States	0.96 ^a
Age at Diagnosis	
Mean	64
Median	67
Range	26–87 years

^a Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).



DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute-onset, self-limited flu-like illness without pneumonia. Legionella bacteria are common inhabitants of aquatic systems that thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila serogroup 1*, although at least 46 Legionella species and 70 serogroups have been identified. Transmission occurs through inhalation of aerosols containing the bacteria or by aspiration of contaminated water, and water birthing. Person-to-person transmission does not occur. The case fatality rate for LD ranges from 10%–15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects middle-aged and older persons, particularly those who are heavy smokers, have chronic lung disease, or whose immune systems are suppressed by illness or medication.



DISEASE ABSTRACT

- The incidence of legionellosis in LAC is decreasing.
- Two unrelated nosocomial cases (1 definite and 1 possible) were reported in 2006.
- No cases of Pontiac fever were reported in 2006.
- The case fatality rate decreased from 16% to 4% in 2005 and 2006, respectively.

STRATIFIED DATA

Trends: A total of 24 reported cases met the CDC surveillance case definition for LD in 2006. This is lower than the peak incidence of 32 cases reported in 1997 in which a community outbreak occurred (Figure 1).

Seasonality: Cases occurred throughout the year, with a peak in October—this peak was unrelated to nosocomial incidents.

Age: Consistent with the expected higher frequency among older persons, the mean age of reported cases was 64 years, the median age was 67 years, and the age range was 26-87 years.

Fatality: In 2006, the fatality rate decreased to 4% (1/24) compared to 16% (5/31) in 2005. The age of the expired case was 73 years.

Gender: There were 13 (54%) male cases and 11 (46%) female cases.

Race: The majority of cases 42% (n=10) occurred in whites. The next most reported racial group was Asians 25% (n=6), Hispanics 21% (n= 5), followed by blacks 12% (n=3).

Ethnicity: The majority of cases reported were among non-Hispanics 79% (n=19), as compared to Hispanics 21% (n= 5).

COMMENTS

In 2006, 22 (92%) LD cases were diagnosed by Legionella urinary antigen, 2 (8%) were diagnosed by direct fluorescent antibody (DFA) staining, and none by BAL/sputum culture, or serologic antibody titers. As in 2005, the Legionella urinary antigen was the most frequently used method to diagnose LD due to the ease of its use and specificity. This test also facilitates diagnosis; therefore, is very useful for prompt initiation of treatment by clinicians. However, this diagnostic test will only consistently screen for Legionella pneumophila serogroup 1. Not using culture to detect infection could result in an incomplete surveillance of legionellosis. LAC encourages all providers who suspect a case of nosocomial legionella to include culture for diagnosis so further testing of the isolate may be performed. Serological testing is not commonly used due to its low sensitivity and needs further research to determine its reliability. This diagnostic method offers minimal impact to patients for their therapeutic management because seroconversion occurs later during the course of infection.

Legionnaire's disease is more prevalent during summer and early fall. The more favorable weather conditions could explain increased exposure risk during outdoor and recreational activities (i.e., hot tubs, cruise ships, hotels, swimming pools, etc). However, data show that LD is equally distributed throughout the year. Outbreaks of LD continue to occur worldwide and surveillance is in full force. There were 4 travel related cases this year 17% (n=4). These cases were found to be unrelated to any outbreak case through collaboration with the Centers for Disease Control and Prevention and the California Department of Health Services..

One definite nosocomial and one possible nosocomial LD case were reported in LAC in 2006 by different medical facilities. Each medical facility conducted eight weeks of prospective active surveillance and six months of retrospective review to detect other possible cases of nosocomial related LD. No additional LD cases were found in either situation.

The number of LD cases in LAC has decreased despite improvements in reporting, monitoring, and ease of diagnostic methods. In 2006, there were 41 reported cases, compared to 43 cases in 2005, a 5% decrease. There are no specific reasons for the decline in the number of cases that met the case definition, but the following are considered to be some of the factors that may have contributed to this decline: 1) clinical awareness continues to be low despite the number of years since LD was first detected; 2) clinicians are still not familiar with the timing of serology collection of single titers to meet the

laboratory criteria of case definition; 3) cases may have been missed due to convalescent samples being taken prematurely or not at all; 4) challenge of calling providers to order tests, although the individual is willing to submit; and 5) individual is unwilling to test due to financial reasons and/or don't see the importance of follow-up after treatment. For surveillance to be more effective and to help identify future trends of the disease and possible changing epidemiology, clinicians should consider LD as a differential diagnosis in patients who present with atypical or nosocomial pneumonia. Legionella will be made a mandatory laboratory reportable disease in 2007.

Reasons for the decrease in the case fatality rate are unknown. It is hypothetically possible that an increase in surveillance has resulted in the increased finding of more mild disease though this is not supported by our total number of reported cases.

ADDITIONAL RESOURCES

Guidelines:

CDC. Guidelines for environmental infection control in health-care facilities: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). MMWR 2003; 52(RR10):1-42. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/rr5210a1.htm

CDC. Guidelines for preventing health-care associated pneumonia, 2003: recommendations of CDC and the Healthcare Infection Practices Advisory Committee (HICPAC). MMWR 2004; 53(RR3):1-36. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/rr5303a1.htm

Squier CL, Stout JE, Krsyotfiak S, et al. A proactive approach to prevention of health care-acquired Legionnaires' disease: the Allegheny County (Pittsburg) experience. Am J Infect Control 2005; 33(6):360-367.

State of Maryland, Department of Health and Mental Hygiene. Report of the Maryland scientific working group to study legionella in water systems in healthcare institutions. June 14, 2000. Report available at: www.dhmm.state.md.us/html/legionella.htm

LAC Department of Health Services. Legionellosis: taking the mystery out of laboratory diagnosis. The Public's Health 2001; 1(3):4-5. Available at: www.lapublichealth.org/wwwfiles/ph/ph/TPH_October_2001.pdf

Reviews:

- Stout JE, Yu VL. Hospital-acquired Legionnaires' disease: new developments. Curr Opin Infect Dis 2003; 16(4):337-341.
- Sabria M, Yu VL. Hospital-acquired legionellosis: solutions for a preventable infection. Lancet Infect Dis 2002; 2(6):368-373.

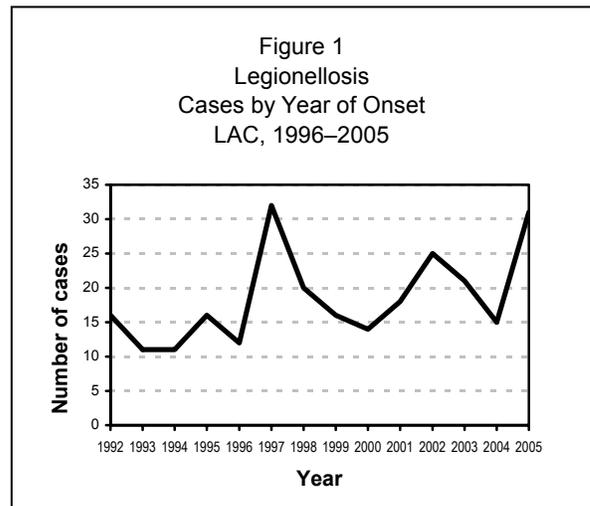
Selected Articles:

- Benin AL, Benson RF, Besser RE. Trends in Legionnaires' disease, 1980- 1998: declining mortality and new patterns of diagnosis. Clin Infect Dis 2002; 35(9):1039-1046.
- Garbino J, Bornand JE, Uckay I, Fonseca S, Sax H. Impact of positive legionella urinary antigen test on patient management and improvement of antibiotic use. J Clin Pathol 2004; 57(12):1302-1305.
- Franzin L, Scolfaro C, Cabodi D, Valera M, Tovo PA. *Legionella pneumophila* pneumonia in a newborn after water birth: a new mode of transmission. Clin Infect Dis 2001; 33(9):e103-104.
- Fields BS, Benson RF, Besser RE. Legionella and Legionnaires' disease: 25 years of investigation. Clin Microbiol Rev 2002; 15(3):506-526.



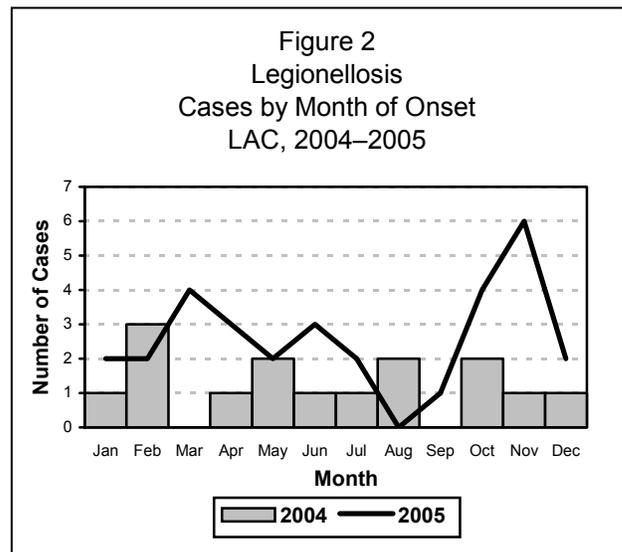
LEGIONELLOSIS

CRUDE DATA	
Number of Cases	31
Annual Incidence	
LA County	0.32
United States	N/A
Age at Diagnosis	
Mean	62.8
Median	62
Range	35–86 years
Case Fatality	
LA County	16%
United States	N/A



DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute-onset, self-limited flu-like illness without pneumonia. *Legionella* bacteria are common inhabitants of aquatic systems and thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila*, although at least 46 *Legionella* species and 70 serogroups have been identified. Transmission occurs through inhalation of aerosols containing the bacteria or by aspiration of contaminated water. Person-to-person transmission does not occur. The case fatality rate for LD ranges from 10%–15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects middle-aged and older persons, particularly those who are heavy smokers, have chronic lung disease, or whose immune system is suppressed by illness or medication.



DISEASE ABSTRACT

- The incidence of Legionellosis in LAC is increasing.
- Two nosocomial cases were reported in 2005.
- No cases of Pontiac fever were reported in 2005.
- The case fatality decreased from 20% to 16% in 2004 and 2005, respectively.



STRATIFIED DATA

Trends: A total of 31 reported cases met the CDC surveillance case definition for LD in 2005. This is slightly lower than the peak incidence of 32 cases reported in 1997 (Figure 1).

Seasonality: Cases occurred throughout the year, with a peak in November—this peak was unrelated to nosocomial incidents.

Age: Consistent with the expected higher frequency among older persons, the mean age of reported cases was 63 years, the median age 62 years, and the range was 35-86 years.

Fatality: In 2005, the case fatality rate of 16% (5/31) was lower than in 2004, 20% (3/15). The mean age of expired cases was 62 years and the median age was 59 years (range 35-82 years).

Gender: There were 21 (68%) male cases and 10 (32%) female cases.

Race: The majority of cases (n=12, 39%) occurred in Whites. The next most frequently reported racial group was Hispanics (n=10, 32%), Asian (n= 7, 23%), followed by Black (n=2, 6%).

Ethnicity: The majority of cases reported were non-Hispanic (n=21, 68%) and (n= 10, 32%) cases reported Hispanic ethnicity.

COMMENTS

In 2005, 23 (74%) LD cases were diagnosed by Legionella urinary antigen, 3 (10%) were diagnosed by direct fluorescent antibody (DFA) staining, 3 (10%) by BAL/sputum culture, and 2 (6%) by serologic antibody titers. As in 2004, the Legionella urinary antigen was the most frequently used method to diagnose LD. However, this diagnostic test will only screen for Legionella pneumophila serogroup 1.

Legionnaire's disease is more prevalent during summer and early fall. The more favorable weather conditions could explain increased exposure risk during outdoor and recreational activities (i.e. hot tubs, cruise ships, hotels, swimming pools, etc). However, our data show LD is equally distributed throughout the year.

Two nosocomial LD cases were reported at LAC in 2005 by separate medical facilities. Each medical facility conducted eight weeks of prospective active surveillance to detect other possible cases of nosocomially related LD as well as six months of retrospective review to determine if additional LD cases could be found. No additional LD cases were found by either prospective or retrospective surveillance methods.

The number of LD cases in LAC has increased as reporting and monitoring procedure improved. In 2005, we had 43 reported cases, a 39% increase, compared to 31 cases reported in 2004. The utilization of automated laboratory reporting and heightened awareness about the disease can explain the increasing trend of cases reported. Other probable reasons could be due to the improvement of the physician's ability to diagnose LD, associated with the available diagnostic assays. However, some providers are not familiar of the timing of serology collection of single titers to meet the laboratory criteria of case definition. Some cases may have been missed due to convalescent samples taken prematurely or not at all.

ADDITIONAL RESOURCES

Guidelines:

Centers for Disease Control and Prevention. 2003. Guidelines for environmental infection control in health-care facilities: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). MMWR; 52 (RR-10): 1-249. Available at: www.cdc.gov/ncidod/dhqp/gl/environinfection.html



Centers for Disease Control and Prevention. 2004. Guidelines for preventing health-care associated pneumonia, 2003: recommendations of CDC and the Healthcare Infection Practices Advisory Committee (HICPAC). MMWR; 53(RR-3): 1-179.

Dixon B, Krystofiak S, McMahon J, Stout J, Squier C, Wagener M, Yu VL. A proactive approach to prevention of health care-acquired Legionnaires' disease: The Allegheny County (Pittsburg) experience. American Journal of Infection Control 2005;33:360-7.

State of Maryland, Department of Health and Mental Hygiene. Report of the Maryland Scientific working Group to Study *Legionella* in Water Systems in Healthcare Institutions. June 14, 2000, Baltimore, Maryland. www.dhmd.state.md.us/html/legionella.htm

LAC Department of Health Services. Legionellosis: Taking the Mystery out of Laboratory Diagnosis. The Public's Health. 2001;1(3):4. Available at: www.lapublichealth.org/wwwfiles/ph/ph/ph/TPH_October_2001.pdf

Reviews:

- Stout JE, Yu VL; Hospital-acquired Legionnaires' disease: new developments. Current Opinion in Infectious Disease 2003, 16:337-341.
- Sabria M, Yu VL, Hospital-acquired legionellosis: solutions for a preventable infection. The Lancet Infectious Diseases Vol 2 June 2002.

Selected Articles:

- Benin AL, Benson RF, Besser RE. Trends in Legionnaires Disease, 1980- 1998; Declining Mortality and New Patterns of Diagnosis. Clinical Infectious Diseases 2002; 35:1039-46.

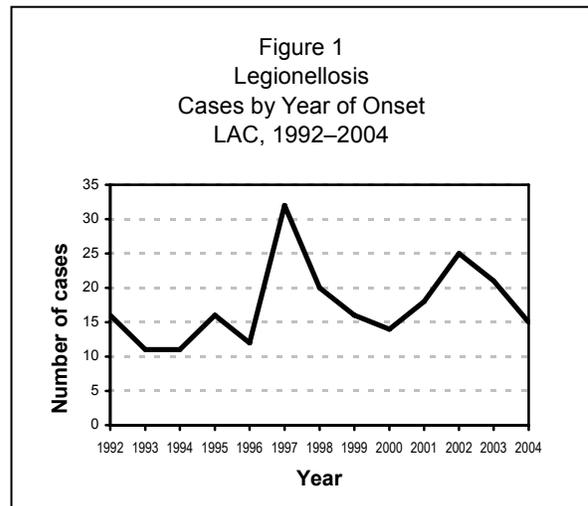


LEGIONELLOSIS

CRUDE DATA	
Number of Cases	15
Annual Incidence ^a	
LA County	--- ^b
United States	N/A
Age at Diagnosis	
Mean	61
Median	62
Range	32-92 years
Case Fatality	
LA County	20%
United States	N/A

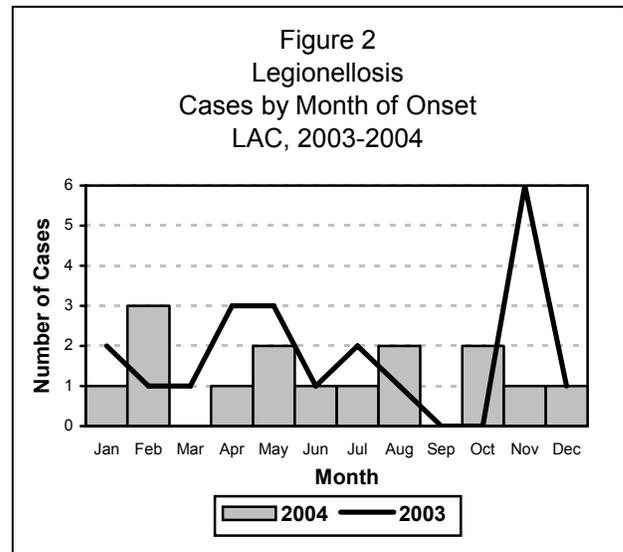
^a Cases per 100,000 population.

^b Rates based on fewer than 20 cases are unreliable.



DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute-onset, self-limited flu-like illness without pneumonia. *Legionella* bacteria are common inhabitants of aquatic systems and thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila*, although at least 11 other species and a number of serogroups are known to cause disease in humans. Transmission occurs through inhalation of aerosols containing the bacteria or by aspiration of contaminated water. Person-to-person transmission does not occur. The case fatality rate for LD ranges from 5%–15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects middle-aged and older persons, particularly those who are heavy smokers, have chronic lung disease, or whose immune system is suppressed by illness or medication.



DISEASE ABSTRACT

- As in previous years, the incidence of Legionellosis in LAC was below national levels.
- One definite and one probable nosocomial case were reported in 2004.
- No cases of Pontiac fever were reported in 2004.
- The case fatality decreased from 29% to 20% in 2003 and 2004, respectively.



STRATIFIED DATA

Trends: Fifteen reported cases met the CDC surveillance case definition for LD in 2004. This is noticeably lower than the peak incidence of 32 cases reported in 1997 (Figure 1).

Seasonality: Seven cases (47%) occurred during the summer and autumn months (June through November) whereas eight (53%) occurred during the winter and spring (Figure 2). No seasonality trends were documented in 2004.

Age: Consistent with the expected higher frequency among older persons, the mean age of reported cases was 61 years, the median age was 62 years, and the range was 32-92 years.

Fatality: In 2004, the case fatality rate of 20% (3/15) was lower than in 2003, 29% (6/21). The mean age of expired cases was 61 years and the median age was 64 years (range: 55-65 years).

Gender: There were seven (47%) male cases and eight (53%) female cases.

Race: The majority of cases (n=6, 40%) occurred in Hispanics. The next most frequently reported racial group was White (n= 5, 33%), followed by Asian (n=2, 13%) and Black (n=2, 13%).

Ethnicity: The majority of cases reported their ethnicity to be non Hispanic (n=9, 60%), 5 (33%) cases reported Hispanic ethnicity, and 1 (7%) case reported unknown ethnicity.

COMMENTS

In 2004, 11 (73%) LD cases were diagnosed by Legionella urinary antigen, three (20%) were diagnosed by direct fluorescent antibody (DFA) staining and one (7%) by sputum culture. As in 2003, the Legionella urinary antigen was the most frequently used method to diagnose LD. However, this diagnostic technique will only screen for *Legionella pneumophilla* serogroup 1.

There was one definite and one probable nosocomial LD case reported at a single LAC medical facility in 2004. An ACDC medical epidemiologist conducted a site visit and chart review of the two LD cases at the medical facility to investigate the nosocomial LD cases. Environmental testing was carried out by the medical facility to determine if LD was detectable in the potable water that the patients' could have been exposed to, however, no *Legionella pneumophilla* was recovered. The medical facility conducted eight weeks of prospective active surveillance to detect other possible cases of nosocomially related LD as well as one year of retrospective laboratory review to determine if additional LD cases could be found. No additional LD cases were found from both prospective and retrospective surveillance methods.

The number of cases of Legionellosis in LAC remains lower than expected based on national surveillance data and other epidemiologic studies. Empiric treatment for community-acquired pneumonia without specific testing for *Legionella pneumophila*, inappropriate laboratory testing (use of a single serologic antibody titer testing without convalescent titers), and underreporting by physicians are possible explanations.

ADDITIONAL RESOURCES

Guidelines:

- CDC. Guidelines for prevention of nosocomial pneumonia. MMWR 1997; (RR-1):1-79. www.cdc.gov/ncidod/diseases/hip/pneumonia/pneu_mmw.htm
- Allegheny County Health Department. Approaches to prevention and control of Legionella infection in Allegheny County health care facilities. 2nd ed. Pittsburgh, PA: Allegheny County Health Department. 1997:1-15. www.legionella.org



- State of Maryland, Department of Health and Mental Hygiene. Report of the Maryland Scientific working Group to Study *Legionella* in Water Systems in Healthcare Institutions. June 14, 2000, Baltimore, Maryland. www.dhmv.state.md.us/html/legionella.htm
- ASHRAE. Guideline 12-2000. Minimizing the risk of legionellosis associated with building water systems. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, GA., 1999. www.ASHRAE.org or www.baltimoreaircoil.com/index1.html
- LAC Department of Health Services. Legionellosis: Taking the Mystery out of Laboratory Diagnosis. The Public's Health. 2001;1(3):4. Available at: www.lapublichealth.org/wwwfiles/ph/ph/ph/TPH_October_2001.pdf

Reviews:

- Stout JE, Yu VL; Legionellosis. N Engl J Med 1997; 337:682–687.
- Breiman RF, Butler JC: Legionnaires' disease: clinical, epidemiological, and public health perspectives. Semin Respir Infect 1998; 13:84–89.

Selected Articles:

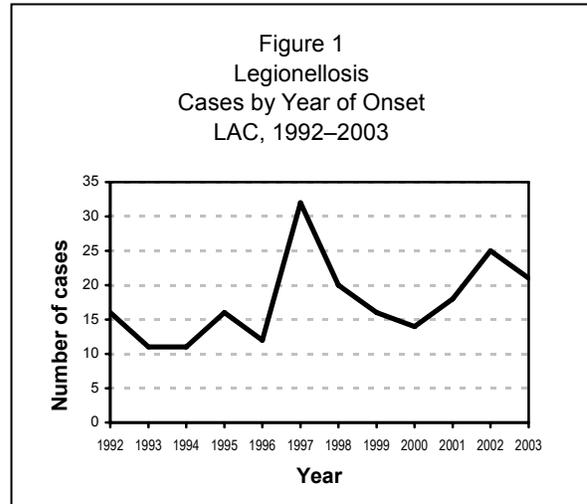
- Lin YS, Stout JE, Yu VL, Vidic RD. Disinfection of water distribution systems for *Legionella*. Semin Respir Infect 1998; 13:147–59.
- Yu VL. Resolving the controversy on environmental cultures for *Legionella*: A modest proposal. Infect Control Hosp Epidemiol 1998; 19:893–7.



LEGIONELLOSIS

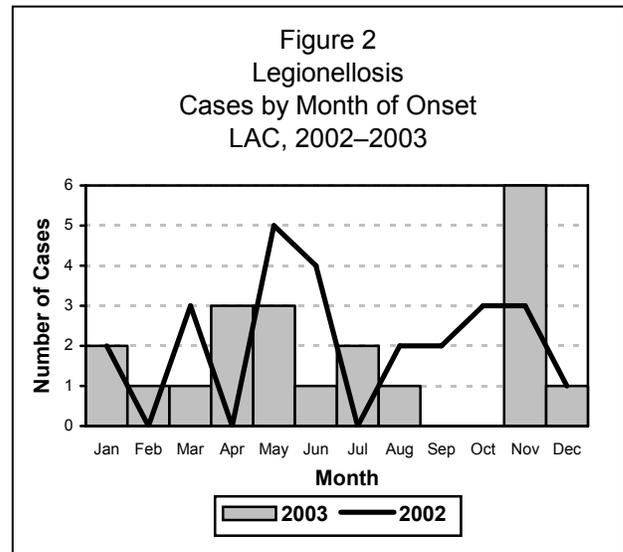
CRUDE DATA	
Number of Cases	21
Annual Incidence ^a	
LA County*	N/A
United States	N/A
Age at Diagnosis	
Mean	56
Median	59
Range	13-89 years
Case Fatality	
LA County	29%
United States	N/A

^a Cases per 100,000 population.



DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute-onset, self-limited flu-like illness without pneumonia. *Legionella* bacteria are common inhabitants of aquatic systems and thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila*, although at least 11 other species and a number of serogroups are known to cause disease in humans. Transmission occurs through inhalation of aerosols containing the bacteria or by aspiration of contaminated water. Person-to-person transmission does not occur. The case fatality rate for LD ranges from 5%–15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects middle-aged and older persons, particularly those who are heavy smokers, have chronic lung disease, or whose immune system is suppressed by illness or medication.



DISEASE ABSTRACT

- As in previous years, the incidence of Legionellosis in LAC was below national levels.
- One definite nosocomial case was reported in 2003.
- There were no cases of Pontiac fever.
- The case fatality increased from 12% in 2002 to 29% in 2003.



STRATIFIED DATA

Trends: Twenty-one reported cases met the CDC surveillance case definition for LD in 2003. This is noticeably lower than the peak incidence of 32 cases reported in 1997 (Figure 1).

Seasonality: Ten cases 48% occurred during the summer and autumn months (June through November) whereas eleven (52%) occurred during the winter and spring Figure 2.

Age: Consistent with the expected higher frequency among older persons, the mean age of reported cases was 56 years, the median age 59 years, and the range was 13–89 years.

Fatality: the 2003 case fatality of 29% is higher than in 2002, 16%. The mean age of expired cases was 72 the median age 74, and the range was 57-89 years.

Gender: There were twelve (57%) male cases and nine (43%) female cases. Disproportionately higher rates of Legionellosis occurred among males, a consistent finding for LAC and national surveillance data. Both cigarette smoking and older age are recognized risk factors for LD. An explanation often offered to explain the gender disparity for LD is the higher prevalence of cigarette smoking among males in the older age groups. The gender disparity in prevalence of smoking in the older age groups is expected to narrow or disappear in the near future, as it has among younger age groups.

Race: The majority of cases (n=14, 67%) occurred in Whites. The next most frequently reported racial group was Black (n= 5, 24%), followed by Asian (n=1, 5%),

Ethnicity: Not Hispanic (n=12, 57%), Hispanic (n=5, 24%), Unknown (n=4, 19%)

COMMENTS

In 2003, one case (5%) was confirmed by direct fluorescent sputum staining and 20 (95%) by urine antigen testing alone. *Legionella pneumophilla* serogroup 1 was implicated in all but one of the case, possibly reflecting increased use of urine antigen testing, which is specific for Lp1. The proportion of cases of *Legionella* diagnosed by urinary antigen increased from 20 (80%) cases in 2002 to 20 (95%) cases in 2003. It is possible that this relatively easy diagnostic test may contribute to increased diagnosis of Legionellosis in the future since clinicians are using this test more frequently.

There were no Legionellosis outbreaks reported in 2003. One definite and one probable nosocomial cases occurred at two separate medical facilities that were not outbreak associated and were not investigated.

The number of cases of Legionellosis in LAC remains lower than expected based on national surveillance data and other epidemiologic studies. Empiric treatment for community-acquired pneumonia without specific testing for *Legionella pneumophila*, inappropriate laboratory testing (use of a single serologic antibody titer testing without convalescent titers), and underreporting by physicians are possible explanations.

ADDITIONAL RESOURCES

Guidelines:

- CDC. Guidelines for prevention of nosocomial pneumonia. MMWR 1997; (RR-1):1–79. www.cdc.gov/ncidod/diseases/hip/pneumonia/pneu_mmw.htm
- Allegheny County Health Department. Approaches to prevention and control of Legionella infection in Allegheny County health care facilities. 2nd ed. Pittsburgh, PA: Allegheny County Health Department. 1997:1–15. www.legionella.org



- State of Maryland, Department of Health and Mental Hygiene. Report of the Maryland Scientific working Group to Study *Legionella* in Water Systems in Healthcare Institutions. June 14, 2000, Baltimore, Maryland. www.dhmm.state.md.us/html/legionella.htm
- ASHRAE. Guideline 12-2000. Minimizing the risk of legionellosis associated with building water systems. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, GA., 1999. www.ASHRAE.org or www.baltimoreaircoil.com/index1.html
- LAC DHS. Legionellosis: Taking the Mystery out of Laboratory Diagnosis. The Public's Health. 2001;1(3):4. Available at: www.lapublichealth.org/wwwfiles/ph/ph/ph/TPH_October_2001.pdf

Reviews:

- Stout JE, Yu VL; Legionellosis. N Engl J Med 1997; 337:682–687.
- Breiman RF, Butler JC: Legionnaires' disease: clinical, epidemiological, and public health perspectives. Semin Respir Infect 1998; 13:84–89.

Selected Articles:

- Lin YS, Stout JE, Yu VL, Vidic RD. Disinfection of water distribution systems for *Legionella*. Semin Respir Infect 1998; 13:147–59.
- Yu VL. Resolving the controversy on environmental cultures for *Legionella*: A modest proposal. Infect Control Hosp Epidemiol 1998; 19:893 -7.

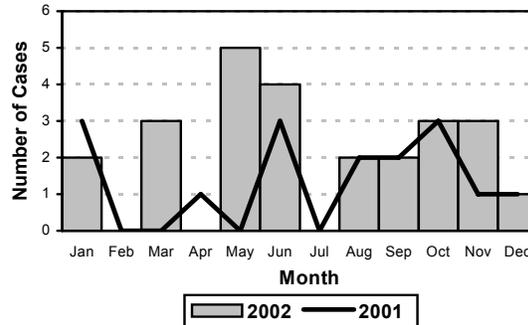


LEGIONELLOSIS

CRUDE DATA	
Number of Cases	25
Annual Incidence ^a	
LA County	0.3
United States	0.4
Age at Diagnosis	
Mean	67
Median	73
Range	51–81 years
Case Fatality	
LA County	12.0%
United States	N/A

^a Cases per 100,000 population.

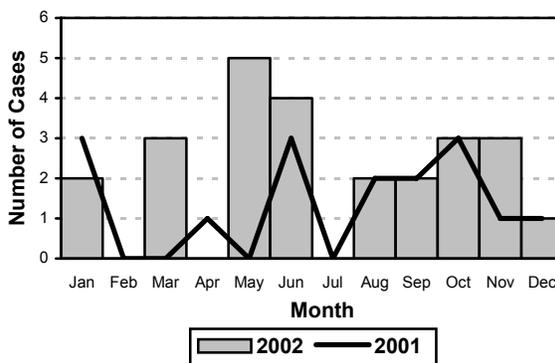
Figure 2
Legionellosis
Cases by Month of Onset
LAC, 2002



DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute-onset, self-limited flu-like illness without pneumonia. *Legionella* bacteria are common inhabitants of aquatic systems and thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila*, although at least 11 other species and a number of serogroups are known to cause disease in humans. Transmission occurs through inhalation of aerosols containing the bacteria or by aspiration of contaminated water. Person-to-person transmission does not occur. The case fatality rate for LD ranges from 5%–15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects middle-aged and older persons, particularly those who are heavy smokers, have chronic lung disease, or whose immune system is suppressed by illness or medication.

Figure 2
Legionellosis
Cases by Month of Onset
LAC, 2002



DISEASE ABSTRACT

- As in previous years, the incidence of legionellosis in LAC was below national levels.
- Three definite and six possible nosocomial cases were identified in one medical facility. Findings and recommendations from this outbreak investigation are documented in a 2002 special report.
- There were no cases of Pontiac fever.



STRATIFIED DATA

Trends: Twenty-five reported cases met the CDC surveillance case definition for LD in 2002. This is noticeably lower than the peak incidence of 32 cases reported in 1997 (Figure 1).

Seasonality: Fifteen cases (60%) occurred during the summer and autumn months (June through November, Figure 2). This is consistent with national surveillance data and possibly represents increased exposure related to travel and/or contaminated air-cooling systems during warmer months.

Age: Consistent with the expected higher frequency among older persons, the mean age of reported cases was 67 years, the median age 73 years, and the range was 51–81 years.

Gender: The male-to-female case ratio was 2.1:1. Disproportionately higher rates of legionellosis occurred among males—a consistent finding for LAC and national surveillance data. Both cigarette smoking and older age are recognized risk factors for LD. An explanation often offered to explain the gender disparity in LD is the higher prevalence of cigarette smoking among males in the older age groups. The gender disparity in prevalence of smoking in the older age groups is expected to narrow or disappear in the near future, as it has among younger age groups.

Race: The majority of cases (n=14, 56%) occurred in Whites. The next most frequently reported racial group was Latino (n= 5, 20%), followed by Asian (n=3, 12%), and Black (n=1, 4%). Racial group was not reported for two (8%) cases.

Location: There was no apparent clustering by residence; no more than two cases each occurred among any of the eight health districts.

COMMENTS

In 2002, three (12%) cases were confirmed by culture alone, two (8%) by direct fluorescent antigen testing of the sputum, and 20 (80%) by urine antigen testing alone. *Legionella pneumophila* serogroup 1 was implicated in all but five of the cases, possibly reflecting increased use of urine antigen testing, which is specific for Lp1. The proportion of cases of *Legionella* diagnosed by urinary antigen increased only slightly from 14 (78%) cases in 2001 to 20 (80%) cases in 2002. It is possible that this relatively easy diagnostic test may contribute to increased diagnosis of legionellosis in the future since clinicians are using this test more frequently.

One outbreak of legionellosis in a medical facility had three definite and six probable nosocomial cases. CDC guidelines for investigation of nosocomial legionellosis were followed at the facility, outbreak control recommendations were implemented, and no additional cases were identified after July 2002. A detailed summary of this investigation is presented as a special report.

Two additional definite nosocomial cases occurred at two separate medical facilities that were not outbreak associated and were not investigated.

The number of cases of legionellosis in LAC remains lower than expected based on national surveillance data and other epidemiologic studies. Empiric treatment for community-acquired pneumonia without specific testing for *Legionella*, inappropriate laboratory testing (use of a single serologic antibody titer testing without convalescent titers), and underreporting by physicians are possible explanations.



ADDITIONAL RESOURCES

Guidelines:

- CDC. Guidelines for prevention of nosocomial pneumonia. MMWR 1997; (RR-1):1–79. www.cdc.gov/ncidod/diseases/hip/pneumonia/pneu_mmw.htm
- Allegheny County Health Department. Approaches to prevention and control of Legionella infection in Allegheny County health care facilities. 2nd ed. Pittsburgh, PA: Allegheny County Health Department. 1997:1–15. www.legionella.org
- State of Maryland, Department of Health and Mental Hygiene. Report of the Maryland Scientific working Group to Study *Legionella* in Water Systems in Healthcare Institutions. June 14, 2000, Baltimore, Maryland. www.dhmh.state.md.us/html/legionella.htm
- ASHRAE. Guideline 12, 2000. Minimizing the risk of legionellosis associated with building water systems. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, GA., 1999. www.ASHRAE.org or www.baltimoreaircoil.com/index1.html
- LAC Department of Health Services. Legionellosis: Taking the Mystery out of Laboratory Diagnosis. The Public's Health. 2001;1(3):4. Available at: www.lapublichealth.org/wwwfiles/ph/ph/ph/TPH_October_2001.pdf

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- Yu VL. Resolving the controversy on environmental cultures for *Legionella*: A modest proposal. Infect Control Hosp Epidemiol 1998; 19:893–7.