



**COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC HEALTH
IMMUNIZATION PROGRAM
VACCINE-PREVENTABLE DISEASE SURVEILLANCE REPORT
QUARTER 1: JANUARY – MARCH 2009
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BACKGROUND

- The Los Angeles County Immunization Program (LACIP) Epidemiology Unit is responsible for the surveillance and control of the following vaccine-preventable diseases (VPDs): diphtheria, invasive *Haemophilus influenzae* (age<15), measles, mumps, pertussis, polio, rubella (acute and congenital cases), tetanus, and varicella (hospitalized cases, deaths, and outbreaks).
- The current surveillance system is a passive system, with suspect reports coming to LACIP via fax, phone, mail, or a web-based confidential morbidity reporting system (VCMR).
- All suspect reports are investigated. Epidemiology Unit staff conduct an initial assessment via interviews with the reporting physician, reporting laboratory, and patient. Information on patient demographics, symptoms, treatment, laboratory tests, immunization history, exposure history, and transmission potential are collected. If the suspect report meets the case definition and further investigation/management or post-exposure prophylaxis is needed for contacts, the case report is sent out to the appropriate public health district (*i.e.*, health district where patient resides) for a home visit. At the end of the investigation, the case is closed as false, probable, confirmed, or out of jurisdiction.
- Note that the data in this report is provisional and may be incomplete due to time lags in disease reporting and investigation.

SURVEILLANCE OVERVIEW

- More *Haemophilus influenzae* cases were reported this quarter compared to the previous 5-year average for the same time period (Table 1).
- Fewer measles, mumps, pertussis, rubella (congenital), tetanus, and varicella (hospitalized and outbreak) cases were reported this quarter compared to the previous 5-year average for the same time period (Table 1).

TABLE 1. REPORTED VPD CASES, 2009 VS. PREVIOUS 5-YEAR AVERAGE

Disease	Suspect Reports Received 1 st Quarter 2009 ¹	Confirmed and Probable Cases			
		1 st Quarter 2009 ²	Year to Date 2009 ³	Year to date 2004-2008 Five-year average ³	Percent Change
Diphtheria	0	0	0	0	0%
<i>Haemophilus influenzae</i> (age<15, all serotypes)	8	5	5	4.2	19.0%
Measles	16	0	0	0.4	-100%
Mumps ⁴	18	1	1	2.0	-50%
Pertussis	45	31	31	34.8	-10.9%
Poliomyelitis	0	0	0	0	0%
Rubella (acute)	11	0	0	0	0%
Rubella (congenital)	1	0	0	0.2	-100%
Tetanus	0	0	0	0.6	-100%
Varicella (Hospitalized cases) ⁵	10	5	5	5.4	-7.4%
Varicella (Fatal cases)	1	1	1	0	100%
Varicella outbreaks	6	5	5	21.6	-76.9%

¹ Suspect reports with disease onset between January 1 – March 31, 2009. Totals include confirmed, probable, false, and out of jurisdiction cases/outbreaks, as well as suspect cases/outbreaks still under investigation.

² Cases reported with disease onset between January 1 – March 31, 2009. For pertussis, date of cough onset is used. For mumps, date of parotitis onset is used. For measles, rubella, and varicella, date of rash onset is used. For varicella outbreaks, date of first case rash onset is used. Numbers may be incomplete due to time lags in disease reporting and investigation.

³ Cases reported with disease onset between January 1 – March 31.

⁴ Mumps totals only include confirmed cases since the case definition for probable mumps cases was different pre-2006, 2006-2007, and 2008-2009.

⁵ Hospitalized varicella totals include hospitalized cases that were fatal.

TABLE 2. SURVEILLANCE INDICATORS FOR VPDs WITH PROBABLE AND CONFIRMED CASES

Disease	# of Cases	Mean Reporting Lag Time ¹	Median Reporting Lag Time ²	Cases that are Lab-Confirmed	Cases that are Epi-Linked ³	Case Fatalities
				n (%)	n (%)	n (%)
<i>Haemophilus influenzae</i> (age<15, all serotypes)	5	22.0	15.0	5 (100%)	0 (0%)	1 (20.0%)
Mumps	1	8.0	8.0	1 (100%)	n/a	0 (0%)
Pertussis	31	29.9	24.0	11 (35.5%)	6 (19.3%)	0 (0%)
Varicella (Hospitalized cases)	5	11.6	8.0	2 (40.0%)	0 (0%)	1 (20.0%)

¹ Mean number of days from symptom onset to public health report

² Median number of days from symptom onset to public health report

³ Cases that have epidemiological linkages to another case (e.g., relatives, classmates, coworkers, teammates, etc.)

TABLE 3. VACCINATION RATES FOR VPDs WITH PROBABLE AND CONFIRMED CASES

Disease	# of Cases	Cases that are Too Young to Receive Vaccine	Cases that are Eligible to Receive Vaccines and are Up-To-Date ¹	Cases that are Eligible to Receive Vaccines and are Not-Up-To-Date ²	Cases with a PBE ³	Cases with a PME ⁴
		n (%)	n (%)	n (%)	n (%)	n (%)
<i>Haemophilus influenzae</i> (age<15, all serotypes)	5	1 (20.0%)	3 (60.0%)	1 (20.0%)	0 (0%)	0 (0%)
Mumps	1	0 (0%)	0 (0%)	1 (100%)	1 (100%)	0 (0%)
Pertussis	31	6 (19.3%)	7 (22.6%)	18 (58.1%)	2 (6.5%)	1 (3.2%)
Varicella (Hospitalized cases)	5	0 (0%)	0 (0%)	5 (100%)	0 (0%)	0 (0%)

¹ Cases that are up-to-date with the VPD-specific vaccine recommendations for their age. For *Haemophilus influenzae*, data only includes cases that are up-to-date with the Hib vaccine primary series. Due to the vaccine shortage, the CDC's interim guidelines recommend temporary deferral of the booster dose.

² Includes cases that have unknown immunization status or have no valid documentation of receiving vaccinations prior to disease onset.

³ Personal beliefs exemption

⁴ Permanent medical exemption

DISEASE-SPECIFIC SURVEILLANCE TRENDS AND HIGHLIGHTS DURING 1ST QUARTER 2009

Diphtheria:

- No cases have been reported in Los Angeles County (LAC) since 1994 (Table 1).

Haemophilus influenzae (age <15):

- Since June 2007, the only cases of invasive *Haemophilus influenzae* investigated in LAC are those in persons less than 15 years of age.
- There are many strains/serotypes of *Haemophilus influenzae* and they are grouped as follows: 1) serotype B (Hib), 2) non-B (serotypes a, c, d, e, f, and non-typeable), and 3) unknown serotypes. Serotype B is the only serotype that is vaccine-preventable.
- 5 cases (5 confirmed, 0 probable) were reported this quarter (Table 1).
- 60% (n=3) were up-to-date with Hib vaccines (Table 3).
- None of the cases were serotype B, 4 cases were non-B, and 1 was of an unknown serotype. Thus, none of the cases were known to be vaccine-preventable (Table 4).
- 4 cases were hospitalized.

- All 5 cases were less than 5 years of age. The mean ages for non-B and unknown serotypes were 1.3 and 1.0 years, respectively (Table 4).
- One fatality was reported (Table 2). The fatality had underlying medical conditions, had received 3 doses of the Hib vaccine, and was not diagnosed until after an autopsy was performed. The serotype remains unknown.
- SPA 1, SPA 2, SPA 3, SPA 4, and SPA 8 reported one case each. None of the cases were epidemiologically linked to each other (Table 2).

Haemophilus influenzae (age 15+):

- Invasive *Haemophilus influenzae* cases in this age range are not investigated unless they are confirmed to be serotype B cases.
- One confirmed serotype B case was reported this quarter.
- The case was 48 years of age.
- The case resided in SPA 8.
- The case was hospitalized for 3 days with bacteremia and edema of the epiglottis.
- No contacts needed chemoprophylaxis.

Measles:

- No cases have been reported in LAC since March 2008 (Table 1).
- Large measles outbreaks were reported in other parts of the world, including Burkina Faso, France, Iraq, Switzerland, and Vietnam.
- The identification of a measles case in Pennsylvania, who had traveled to India, led to a multi-state investigation. Three LAC residents were identified as contacts but all three did not develop measles from the exposure.
- The California Department of Public Health released a health alert in February regarding the identification of measles cases in California amongst returning international travelers.
- LAC released a health alert in March urging healthcare providers to be vigilant about identifying and reporting measles cases to the local health department.

Mumps:

- One case (1 confirmed, 0 probable) was reported this quarter (Table 1).
- The case was unvaccinated due to a personal beliefs exemption (Table 3).
- The case was 3 years of age.
- The case resided in SPA 5.
- The case had no known exposure to another mumps case but reported a history of travel to New York within 25 days of mumps onset.

Pertussis:

- 31 cases (14 confirmed, 17 probable) were reported this quarter, which is a 10.9% decrease from the previous 5-year average (Table 1).
- Of the 14 confirmed cases, 11 were lab-confirmed and 3 were epi-confirmed (*i.e.*, linked to a lab-confirmed case) (Table 2).
- More than half (58.1%, n=18) of the cases were not up-to-date with the pertussis vaccination recommendations for their age (Table 3).
- Six cases (19.3%) were less than 2 months of age and were too young to be vaccinated (Table 3).
- Two cases had a personal beliefs exemption and one had a permanent medical exemption (Table 3).
- The majority of cases were in the <1 age group (41.9%, n=13) followed by the 15-34 age group (19.3%, n=6), and 45-54 age group (12.9%, n=4) (Figure 2).
- The majority of the cases resided in SPA 6 (25.8%, n=8) followed by SPA 4 (22.6%, n=7) and SPA 2 (16.1%, n=5). SPA 1, SPA 5, and SPA 7 reported three cases each while SPA 3 and SPA 8 reported one case each.
- Epidemiologically-linked cases were reported in SPA 6 (n=3) and in SPA 2 (n=3) (Table 2).

Polio:

- No cases have been reported in LAC since 1987 (Table 1).

Rubella (acute):

- No cases have been reported in LAC since May 2008 (Table 1).

Rubella (congenital):

- No confirmed or probable cases were reported this quarter (Table 1).
- One 3-year old suspect case was identified.
- The child had a complicated birth history, as she was born premature to a cocaine-abusing mother. Maternal history of rubella infection/exposure is unknown.
- The child has bilateral cataracts, bilateral hearing loss, and developmental delay, which are symptoms that are clinically compatible with congenital rubella syndrome.
- The CDC is currently testing the “newborn screening dried blood specimen” to see if rubella antibodies can be detected at the time of birth.

Tetanus:

- No cases have been reported in LAC since July 2008 (Table 1).

Varicella (Hospitalized Cases):

- 5 cases (2 confirmed, 3 probable) were reported this quarter (Table 1).
- None of the cases were up-to-date with varicella vaccine recommendations (Table 3).
- 4 of the cases were immunocompromised.
- The median number of days of hospitalization was 6.0 days.
- 2 of the cases also had pneumonia.
- SPA 3 reported three cases while SPA 4 and SPA 8 reported one case each. One of the cases in SPA 3 was linked to a varicella school outbreak.

Varicella (Fatal Cases):

- One varicella-related fatality was reported this quarter (Table 1).
- The case was lab-confirmed.
- The case was 48 years of age and was immunocompromised due to a history of splenectomy.
- The case was hospitalized for 34 days.
- Per the death certificate, causes of death were sepsis, pneumonia, respiratory failure, and varicella.
- The case resided in SPA 3.

Varicella (Outbreaks):

- 5 outbreaks were reported this quarter, a 76.9% decrease from the previous 5-year average (Table 1).
- All of the outbreaks were in schools (Table 5).
- There was an average of 7.2 cases per outbreak (Table 5).
- SPA 3 reported two outbreaks, while SPA 5, SPA 6, and SPA 7 reported one outbreak each.

LESSONS LEARNED

Haemophilus influenzae

- For Hib (*i.e.*, *Haemophilus influenzae* serotype B) vaccination, the number of doses in the primary series depends on the type of vaccine used. The primary series for the Merck vaccine is two doses compared to three doses for the Sanofi Aventis vaccine. Since December 2007, the CDC has recommended that all children continue to receive the primary series despite the vaccine shortage. In January 2009, the Minnesota Department of Health announced that an unusually high number of

Hib cases (n=5) was reported in their state.¹ According to the CDC, the shortage has led to lower completion of the primary series in several states. Decreased Hib immunization may increase the circulation of Hib bacteria, resulting in increased opportunities for unimmunized and under-immunized children to be exposed to the disease.

Lesson 1: The difference in the number of doses in the primary series is potentially confusing. Providers also may not realize that when more than one brand of vaccine is used (*i.e.*, switching from the Merck to the Sanofi Aventis vaccine), the primary series must consist of three doses. To address the potential confusion, the CDC released a health advisory in March 2009 reemphasizing the importance that all children receive the three dose primary series with the available Sanofi Pasteur vaccine. They also published a variety of resources on their website describing different algorithms to help providers determine how many doses a child needs. As a result of this, LACIP will ensure that all providers regularly receive notification of all current immunization recommendations. LACIP should also take extra steps to address issues that may still be confusing and assist providers with access to resources.

- It is critical that isolates from cases of reportable *Haemophilus influenzae* invasive disease in children (age <15) are serotyped in order to differentiate between serotype B (which is vaccine-preventable) and other serotypes (for which public health control measures are not required). Since 2004, LACIP has requested that local laboratories forward the isolates to the LAC Public Health Laboratory (PHL) for serotyping. In general, local laboratories have complied with this request, such that nearly all isolates for children <15 years of age in LAC have been serotyped. However, during this quarter, one isolate was not tested at a local laboratory but by a coroner's office medical examiner. The examiner was not aware that serotyping needed to be performed. By the time the case was reported to LACIP (a month after the case's death), attempts to serotype a remaining blood sample were unsuccessful.

Lesson 2: Although the coroner's office was aware that *Haemophilus influenzae* cases were reportable to public health, they were not aware of the importance of serotyping. Epidemiology Unit staff addressed this issue with the reporting medical examiner and notified him that all specimens testing positive for *Haemophilus influenzae* should be forwarded to LAC PHL for serotyping. Similarly, other healthcare providers may not be aware of the requirement. Epidemiology Unit staff will ensure that all local laboratories and healthcare providers are aware of the requirement by promptly notifying all facilities that report a suspect case. LACIP should also consider submitting an article for the next issue of "The Public's Health" discussing the reporting, laboratory testing, and immunization issues related to *Haemophilus influenzae*.

- Per California disease reporting laws, cases of invasive *Haemophilus influenzae* in persons 15 years of age and older do not need to be reported to the local health department. The majority of older children and adults are immune to Hib disease. However, LACIP occasionally receives reports of Hib disease in older persons. Prior to this quarter, the cases were documented and filed but not further investigated.

Lesson 3: In January 2009, the California Department of Public Health stated that all invasive Hib cases (regardless of age) needed to be investigated to determine if there are contacts that need prophylaxis. It should be noted though that since specimens for persons in this age category are generally not serotyped, not all Hib cases will be diagnosed or reported.

Personal Beliefs Exemptions and Vaccines

- Three cases (1 mumps and 2 pertussis) reported this quarter had a personal beliefs exemption against vaccinations. For all three cases, the parents cited the risk of autism in their decision to not vaccinate their children. Many scientific studies have looked at the relationship between vaccines and autism. The weight of the evidence indicates that there is no link between autism and MMR vaccine, nor is there evidence of a link between autism and thimerosal-containing vaccines. The California Department of Public Health also recently released data on immunization and exemption rates at individual California schools.²

Lesson 4: Even with all of the scientific evidence, many parents still have concerns about the risks of vaccines. These concerns should not be ignored and need to be addressed if LACIP is to achieve its mission to improve immunization coverage levels and prevent vaccine-preventable diseases. Exploring the range of concerns that parents have when choosing not to vaccinate their children will help health professionals figure out better ways to communicate with parents. LACIP is conducting two studies that will assess personal belief exemption rates in LAC. Furthermore, a workgroup will be started to target areas with high personal belief exemption rates.

NEXT STEPS

- Prepare the 2008 annual VPD report for submission by July 17, 2009.
- Examine 10-year surveillance data to assess personal belief exemption rates among LAC cases by December 2009.

OTHER TABLES AND CHARTS

TABLE 4. HAEMOPHILUS INFLUENZAE CASES (AGE <15) BY SEROTYPE

	Serotype B			Serotype Non-B			Serotype Unknown		
	1 st Quarter 2009 ²	YTD 2009 ³	YTD 2004-2008 5-Yr Avg ³	1 st Quarter 2009 ²	YTD 2009 ³	YTD 2004-2008 5-Yr Avg ³	1 st Quarter 2009 ²	YTD 2009 ³	YTD 2004-2008 5-Yr Avg ³
Total Cases	0	0	0.2	4	4	3.8	1	1	0.2
Age at Onset (years)									
Mean¹	--	--	6.0	1.3	1.3	3.3	1.0	1.0	0.1
Median¹	--	--	6.0	0.5	0.5	2.0	1.0	1.0	0.1
Range¹	--	--	6.0 – 6.0	Birth – 4.0	Birth – 4.0	0.8 – 7.6	1.0 – 1.0	1.0 – 1.0	0.1 – 0.1
Case Fatality¹	--	--	0%	0%	0%	26.3%	100% ⁴	100% ⁴	100%

¹ Five year average calculation in each serotype category only includes years in which cases were identified.

² Cases reported with disease onset between January 1 – March 31, 2009.

³ Cases reported with disease onset between January 1 – March 31.

⁴ One fatality was reported.

FIGURE 1. PERTUSSIS CASES BY MONTH OF DISEASE ONSET

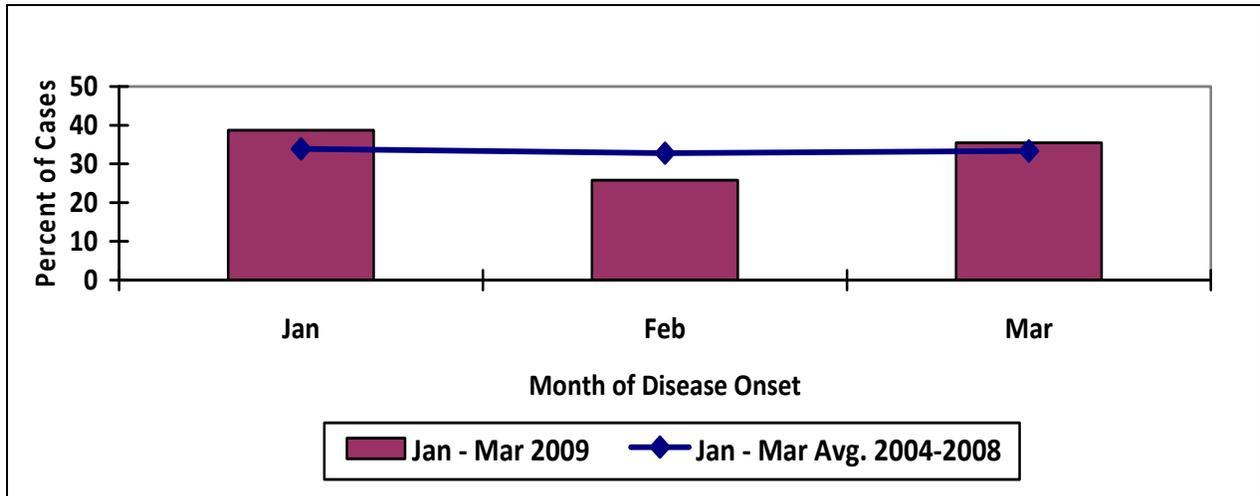


FIGURE 2. PERTUSSIS CASES BY AGE GROUP

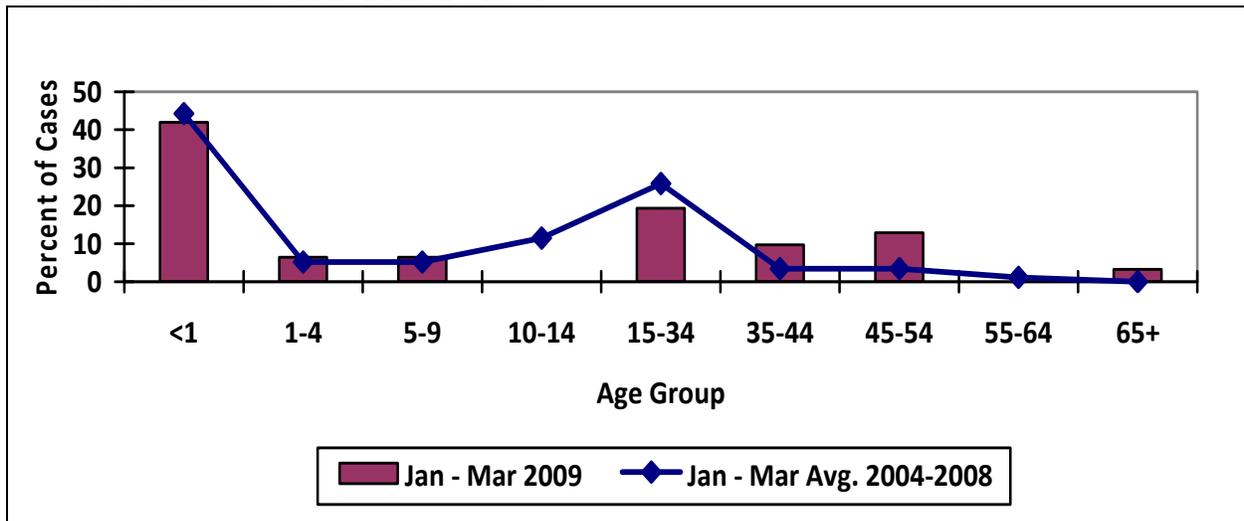


TABLE 5. VARICELLA OUTBREAKS¹

	1 st Quarter 2009 ²		Year to Date 2009 ³		Year to Date 2004-2008 Five-year average ³	
	Health Facility	Non-Health Facility ⁴	Health Facility	Non-Health Facility ⁴	Health Facility	Non-Health Facility
Number of outbreaks	0	5	0	5	0.2	21.4
Average number of cases per outbreak ⁵	--	7.2	--	7.2	0.4	12.3

¹ A non-health facility outbreak is defined as 5 or more cases within a 21-day period. A health facility outbreak is defined as 2 or more cases within a 21-day period.

² First case rash onset was between January 1 – March 31, 2009.

³ First case rash onset was between January 1 – March 31.

⁴ 3 outbreaks were in elementary schools, one was in a middle school, and one was in a university.

REFERENCES

¹ CDC. Invasive *Haemophilus Influenzae* Type B Disease in Five Young Children – Minnesota, 2008. MMWR 2009; 58(03);58-60.

² <http://www.cdph.ca.gov/programs/immunize/Pages/ImmunizationRatesatCaliforniaSchools.aspx>

ADDITIONAL RESOURCES

- National Center for Immunization and Respiratory Diseases – www.cdc.gov/vaccines
- CDPH Immunization Branch – www.cdph.ca.gov/programs/immunize
- LAC Immunization Program – www.publichealth.lacounty.gov/ip