IDPH
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This report looks at mumps cases in Illinois and identifies trends from 2006 through 2014.

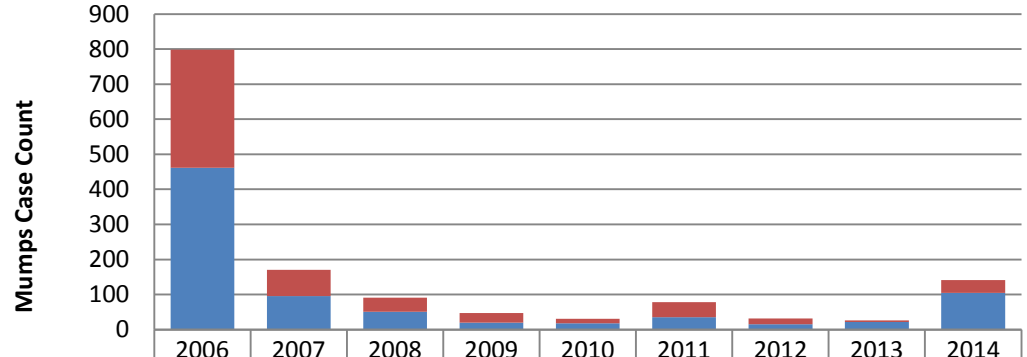
Infectious Disease in Review

Mumps in Illinois

Mumps Trends, Illinois, 2006-2014

Mumps is caused by a paramyxovirus which typically presents as parotitis and lasts at least two days with the potential of persisting longer. The mumps virus is transmitted through respiratory droplets and by direct contact with nasopharyngeal secretions. According to The Centers for Disease Control and Prevention (CDC), mumps outbreaks in the United States vary from year-to-year and in recent years have occurred among school-aged youth and young adults.[1]

Figure 1. Confirmed and Probable Mumps Cases by Year, Illinois, 2006-2014[2]

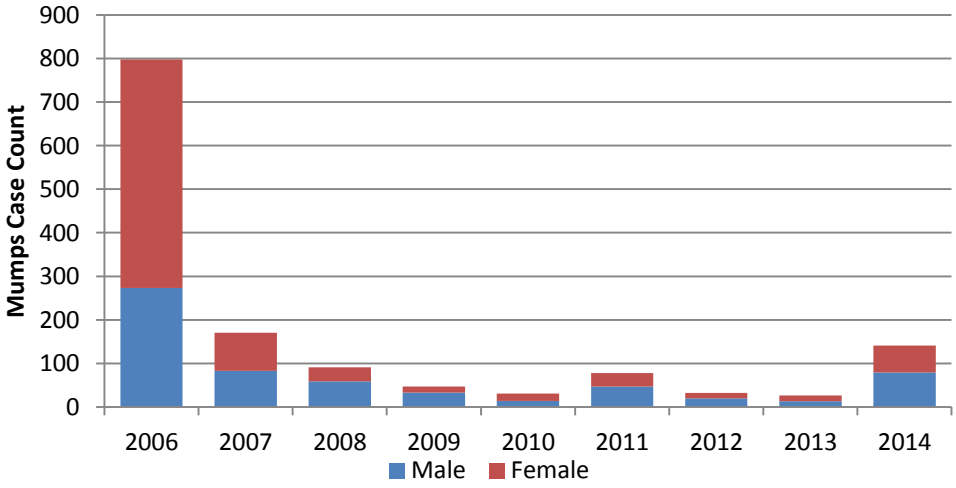


	2006	2007	2008	2009	2010	2011	2012	2013	2014
Confirmed	336	74	40	27	13	43	17	4	36
Probable	462	96	51	20	18	35	15	22	105

As seen in Figure 1, Illinois had approximately 1,414 confirmed (n=590) and probable (n=824) mumps cases reported from 2006 through 2014.[2] Over half of these cases (56.4%, n=798) occurred in 2006 during a large multi-state outbreak.[2]

When looking at mumps cases by sex, females represented 56.0 percent of all cases from 2006 through 2014, and males totaled 44.0 percent.[2] This distribution was affected by the 2006 outbreak. In the years following the 2006 outbreak (2007-2014), males represented 56.6 percent of all cases and females totaled just 43.4 percent.[2]

Figure 2. Mumps Cases by Sex, Illinois, 2006-2014[2]



References
[1]Centers for Disease Control and Prevention, http://www.cdc.gov/mumps/outbreaks.html; Accessed, March 2015
[2]Illinois National Electronic Disease Surveillance System, Private Database; Accessed March 2015
Note: Case definitions can vary from year to year, and should be considered when comparing case counts across years.

Table 1. Mumps Cases and Crude Rates per 100,000 Population by Race, Illinois, 2006-2014[2,3]

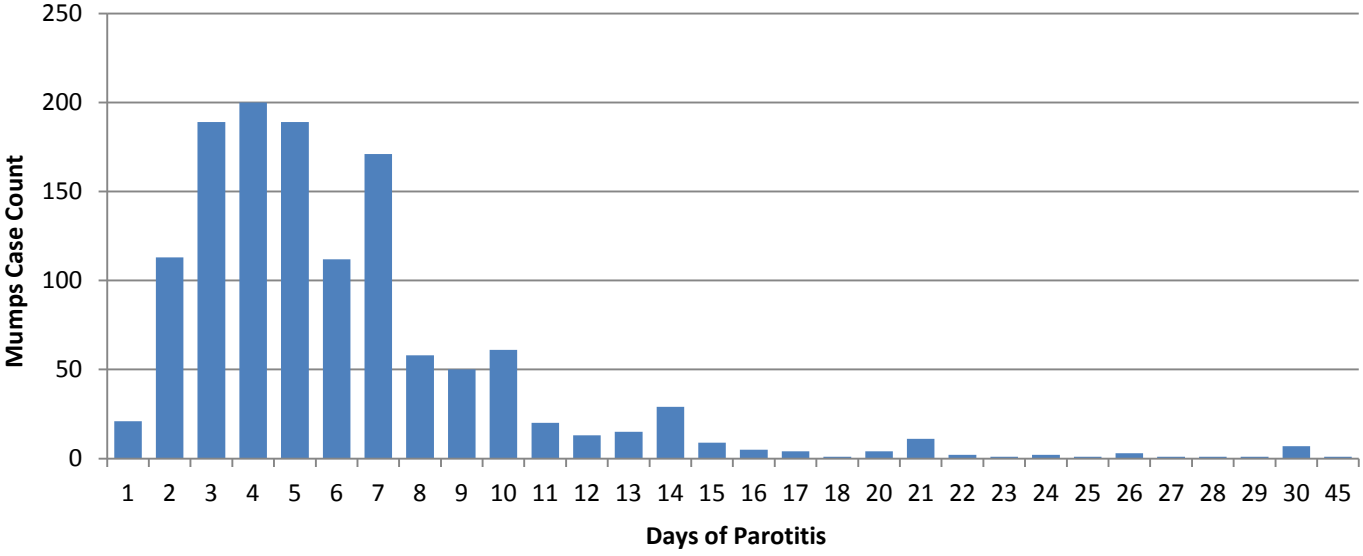
Race	% of Illinois Pop	Mumps Cases	% of Total Cases	Rate Per 100,000 Pop	95 % Confidence Lower Limit	95 % Confidence Upper Limit
Asian	4.6%	48	3.4%	8.18	5.86	10.49
Black or African American	14.5%	111	7.9%	5.95	4.84	7.05
White	71.5%	999	70.7%	10.88	10.21	11.56
Other	-	48	3.4%	-	-	-
Unknown	-	208	14.7%	-	-	-
Illinois Totals		1,414		11.02	10.45	11.59

Note: The race category "Other" is not made up of the same races as the 2010 Census; therefore a rate could not be calculated.

When looking at mumps by race, cases that identify as white accounted for 70.7 percent of all cases in Illinois (n=999), black or African Americans made up 7.9 percent (n=111), Asians made up 3.4 percent (n=48), and 3.4 percent of cases identified as other race.[2] Cases that identify as black or African American experienced fewer mumps infections than expected when compared to the percent this race makes up of the Illinois population (14.5%). However, there were still 14.7 percent (n=208) of mumps cases in Illinois with no race identified.[2]

As seen in Table 1, the mumps rate in Illinois from 2006 through 2014 was 11.02 cases per 100,000 population (range:10.45-11.59).[2,3] Cases that identify as white were the most affected race by mumps with a rate of 10.88 per 100,000 population (range: 10.21-11.56). The rate among black or African American's was 5.95 per 100,000 population (range: 4.84-7.05), and 8.8 (range: 5.86-10.49) for those identifying as Asian.[2,3]

Figure 3. Length of Parotitis Among Mumps Cases in Days, Illinois, 2006-2014[2]



Mumps commonly causes a condition called parotitis, where the patient's salivary glands become very swollen.[1] In Illinois, 91.6 percent of mumps cases from 2006 through 2014 experienced parotitis for at least one day (ranging from 1 to 45 days).[2] As seen in Figure 3, the majority of cases experienced parotitis lasting between two and ten days.[2]

References
[3]U.S. Census Bureau, 2010 Census; Accessed March 2015

Figure 4. Mumps Cases by Month, Illinois, 2007-2014[2]

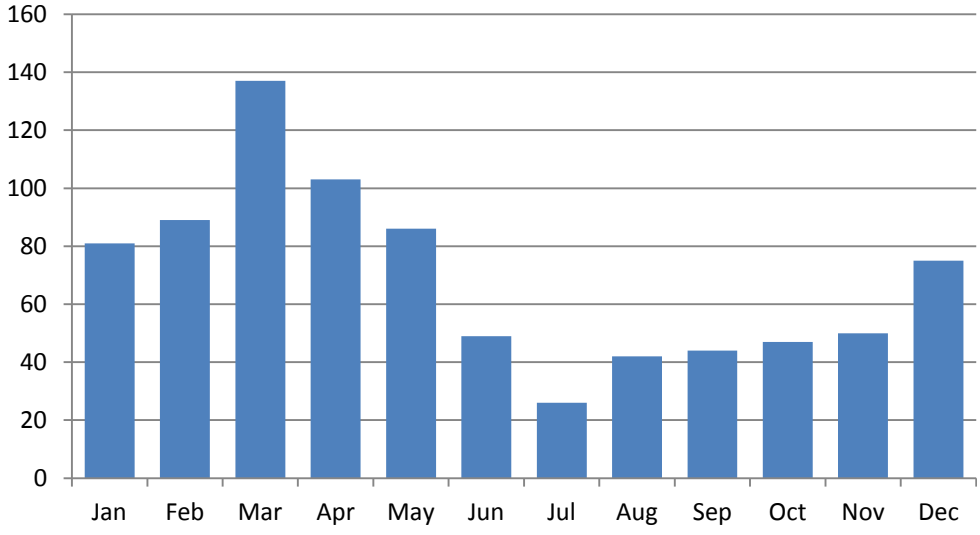


Figure 4 shows seasonal trends of mumps in Illinois from 2007 through 2014 (the 2006 outbreak presents its own unique trends and is displayed separately in Figure 5). Seasonally, mumps in Illinois tends to start early in the year during the months of January and February, and peaks in March before beginning its decline in April. Mumps continues to decline through July with a slight resurgence in the fall.

Figure 5 represents the 2006 outbreak by month and shows very little activity at the beginning of the year. A large surge of mumps cases occurred later than normal in April with a quick decline in May lasting through July into August. In 2006, Illinois saw a slight increase in cases in September, but did not experience the same resurgence in the fall as shown in Figure 4.

Figure 5. Mumps Cases by Month, Illinois, 2006 Outbreak[2]

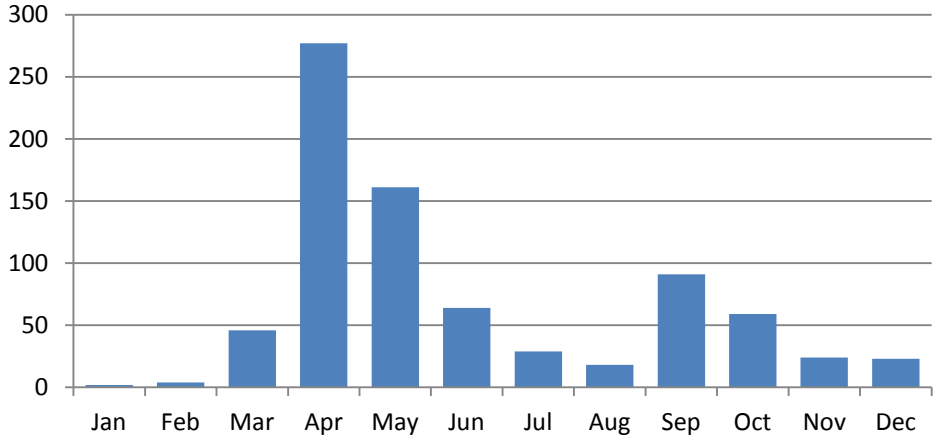


Figure 6 shows mumps trends by month and year from 2007 through 2014. As seen below, some years follow the trends shown in Figure 4 and others mimic the seasonality of the 2006 outbreak.

Figure 6. Mumps Cases by Month, Illinois, 2007-2014[2]

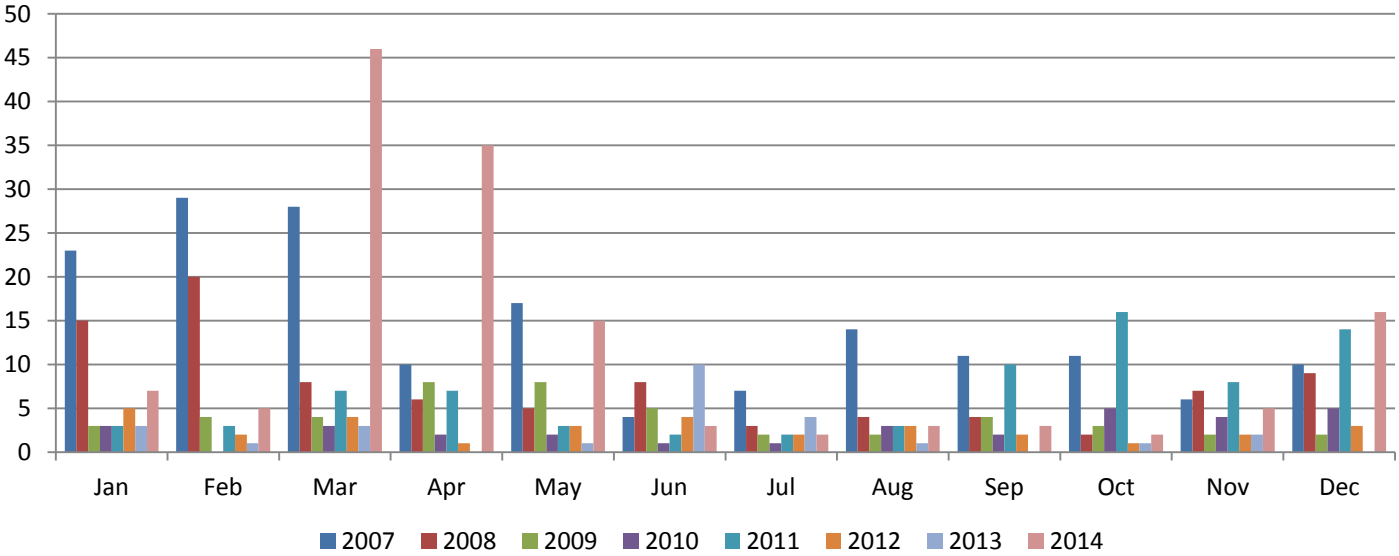
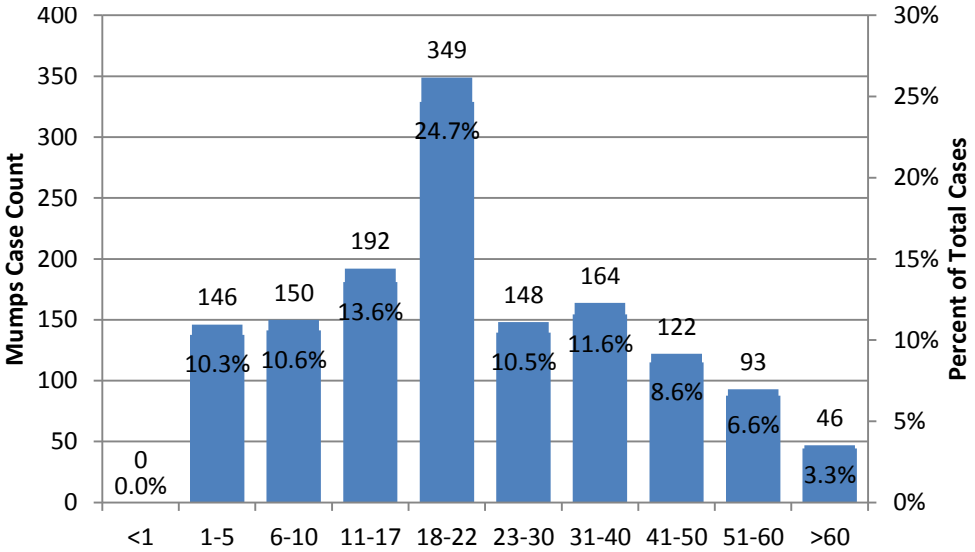


Figure 7. Mumps Cases by Age, Illinois 2006-2014[2]



Note: four cases did not have age data to be included in this figure.

Similar to current national trends[1], Figure 7 shows school-aged youth and young adults ages 6 through 22 years old made up nearly half of the mumps cases in Illinois (48.8%, n=691).[2] When comparing the distribution of mumps by age group to the normal age distribution in Illinois (seen in Figure 8), it is apparent the mumps disease disproportionately affects school-aged youth and young adults more than other age groups.

Although school-aged youth and young adults (6-22 year olds) represent nearly half of all mumps cases in Illinois, these age groups only make up 23.5 percent of the Illinois population.[2,3] Within these age groups, college-aged young adults (18-22 year olds) are the most affected group. This group makes up 24.7 percent (n=349) of all cases, yet only seven percent of the Illinois population.[2,3]

Figure 8. Percentage of Illinois Population, by Age Groups, U.S. Census, 2010[3]

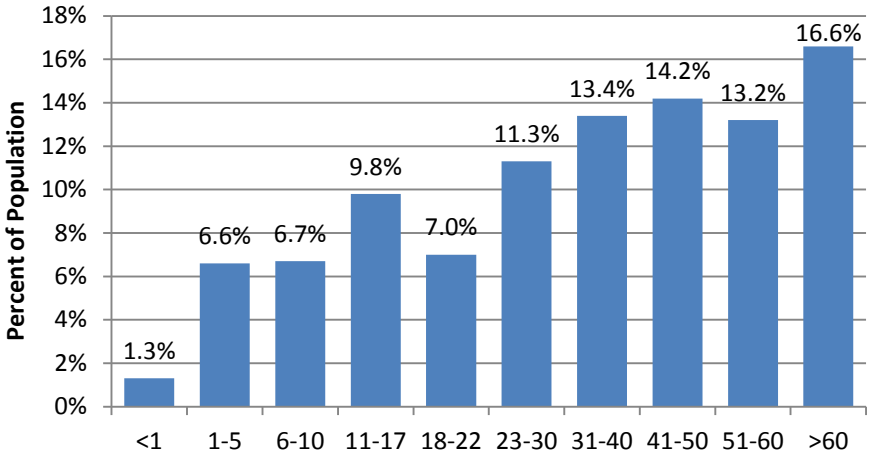
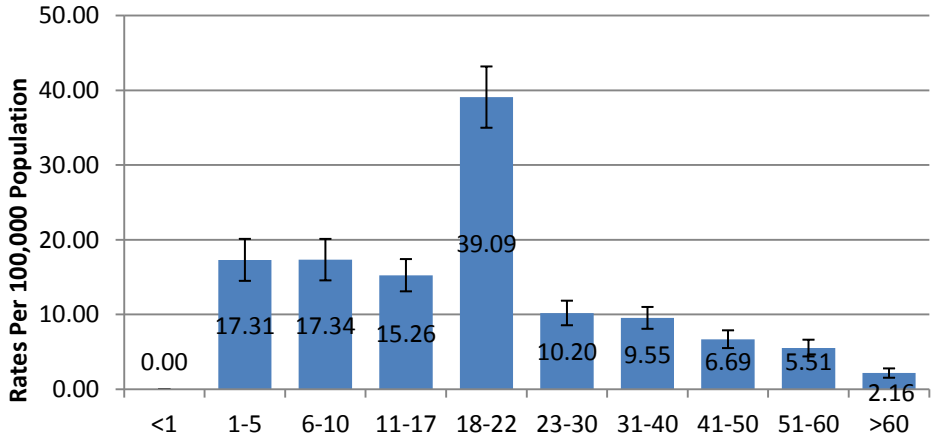


Figure 9. Mumps Crude Rates, by Age Groups, Illinois, 2006-2014[2,3]



As seen in figure 9, the rates of mumps by age group are highest among 18 through 22 year olds (39.09 per 100,000 pop), and second highest among 6 through 10 year olds (17.34 per 100,000 pop). Mumps rates continue to decline as the population ages beyond 22 years of age.

According to CDC, the mumps portion of the MMR (Measles, Mumps and Rubella) vaccine is 88 percent effective (range: 66%-95%) at preventing the mumps disease when two doses are administered[1] following the proper vaccine schedule (first dose administered to children 12-15 months old, and the second at 4-6 years old), and 78 percent effective (range: 49%-92%) at preventing mumps when just one MMR vaccine is received.[1]

Figure 9 shows, from 2006 through 2014, 71.1 percent (n= 1,006) of all cases had been vaccinated before their disease onset, 8.5 percent (n= 120) had not been vaccinated and 20.4 percent (n= 288) were unknown.[2] Figure 10 breaks the 1,006 vaccinated cases into number of doses received, and shows 69.5 percent of vaccinated cases received two or more vaccines, 18.0 percent received one vaccine and 12.5 percent were unknown.[2]

Figure 9. Mumps Cases by MMR Vaccine Status, Illinois 2006-2014[2]

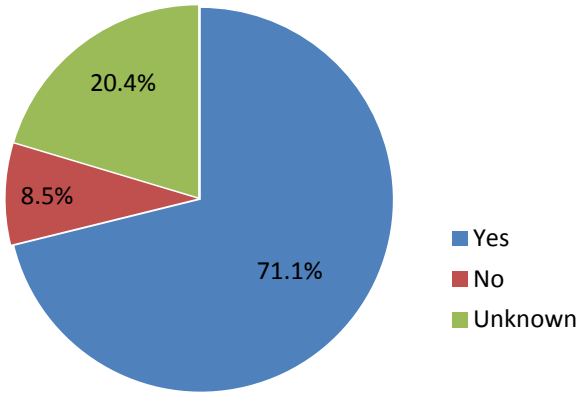
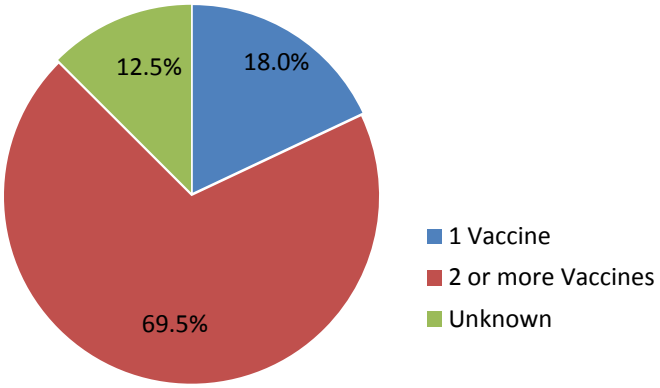
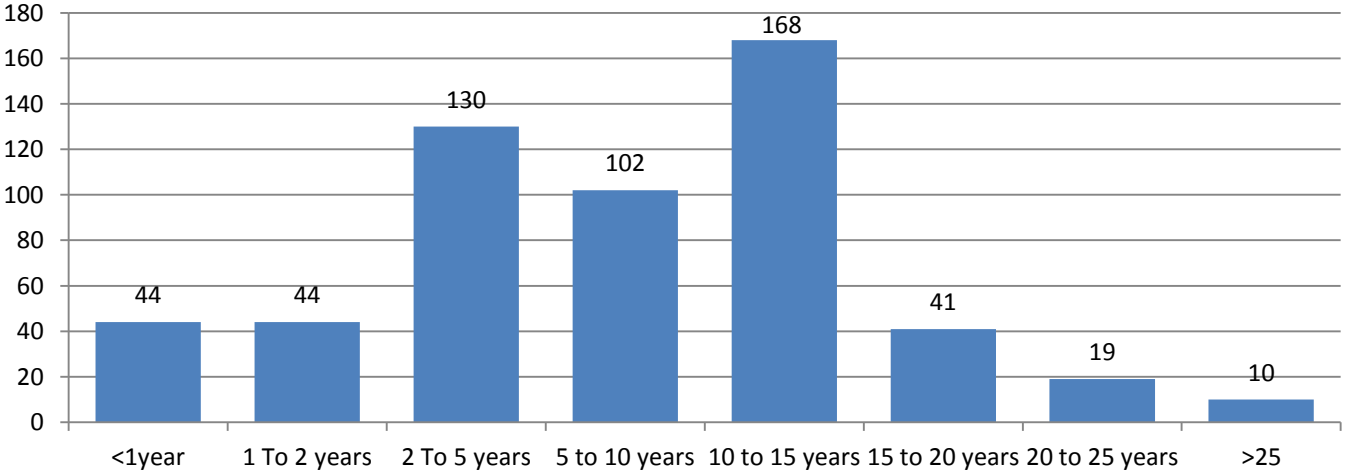


Figure 10. Mumps Cases by Number of MMR Vaccines Received, Illinois 2006-2014[2]



When looking at the time frame between last vaccine and disease onset, Figure 11 shows the majority of mumps cases receiving at least one dose of MMR and still experiencing the disease had received their last dose between 2 and 15 years prior to their disease onset. A total of 558 cases (55.5%) of a potential 1,006 cases receiving at least one MMR vaccine had the necessary vaccine and disease onset dates available to calculate the time frame between these dates.[2]

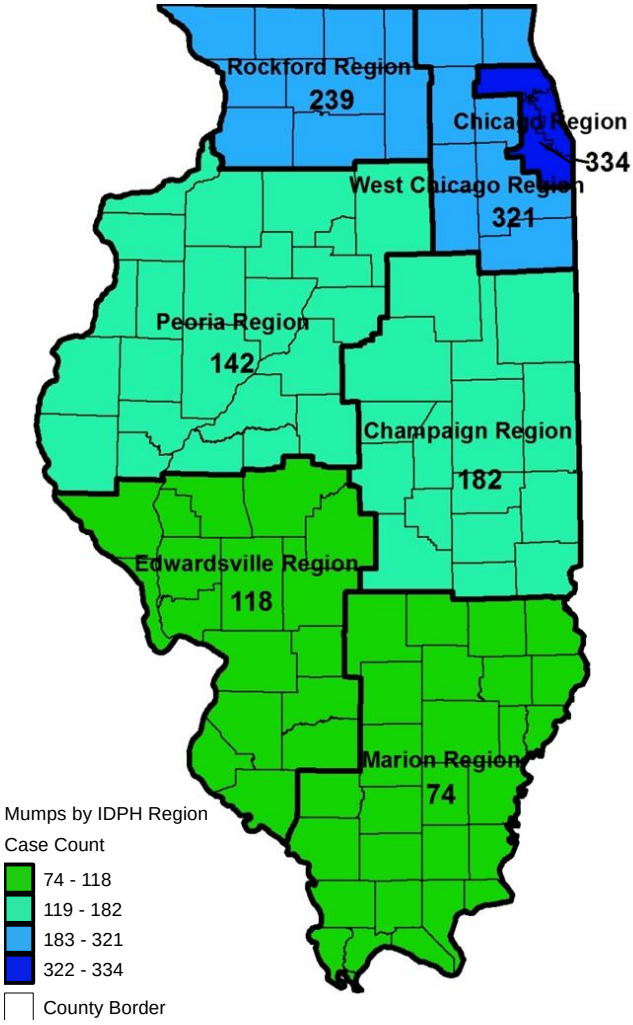
Figure 11.Time Frame Between Last MMR Vaccine Date and Disease Onset Date, Illinois 2006-2014[2]



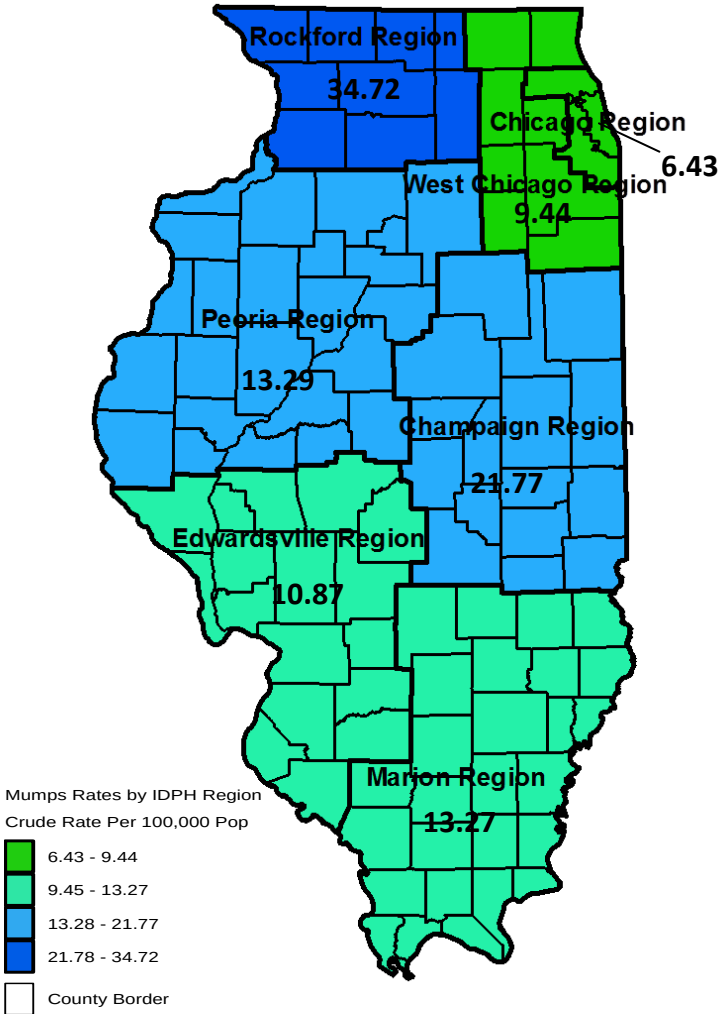
When looking at age, the three time frames from Figure 11 with the highest number of cases are mostly represented by school-aged youth and young adults aged six through 22 years of age.[2] This is supportive of these cases receiving their second MMR dose at four through six years of age (as recommended). Cases aged six through ten years old made up 54.6 percent of cases with a disease onset of 2 to 5 years after their last MMR vaccine, 11 through 17 year olds made up 67.6 percent of cases with a disease onset of 5 to 10 years after, and 18 through 22 year olds made up 46.4 percent of cases with a disease onset of 10 to 15 years after (Note: when adding bordering cases from the 11-17 year old age group, the percent increased to 81.5%).[2]

When looking at mumps cases geographically by region, mumps in Illinois occurred more often in the northern three regions, slightly less in the central two regions and the Edwardsville region, and least in the Marion region.[2] When comparing mumps rates per 100,000 population by region, the highest rate was in the Rockford region (34.72 cases per 100,000 population),[2,3] which can be attributed to the 2006 outbreak being centralized in this region. When looking at the rest of Illinois, the next highest rates are in the Champaign and Peoria regions, and the second lowest quartile is made up of the Edwardsville and Marion regions in the south.[2,3] The lowest rates are seen in the Chicago and West Chicago regions (6.43 and 9.44 per 100,000 pop).[2,3]

Map 1. Mumps Case Counts by IDPH Region, Illinois, 2006-2014[2]



Map 2. Mumps Crude Rates by IDPH Region, Illinois, 2006-2014[2,3]



According to CDC, several mumps outbreaks have been linked to universities nationwide.[1] A geographic analysis of mumps cases from 2006 through 2014 by zip code was completed and revealed 70.9 percent of all mumps cases in Illinois occurred in zip codes with, or neighboring, a college or university (see Map 4).[2] When looking at zip codes with a college or university only, college-aged young adults (18-22 year olds) were found to make up 42.2 percent (n=247) of all mumps cases in these zip codes (among all age groups).[2] When looking within this age group, it was found 70.8 percent of mumps cases among 18 to 22 year olds occurred in zip codes with a college or university. When neighboring zip codes were included, it was found 83.1 percent of cases among 18 to 22 year olds lived in, or bordered, a zip code with a college or university[2]. In addition, 64.0 percent of 6 to 10 year olds and over half of 11 to 17 year olds also lived in these zip codes (56.3%).[2]

Map 3 and 4 Descriptions

These two maps look at the distribution of mumps in Illinois and take an in-depth look at zip codes more likely to have youth and young adults interacting in close quarters, similar to that of various school settings. Both maps are layered over local health department jurisdictions in Illinois.

Methods

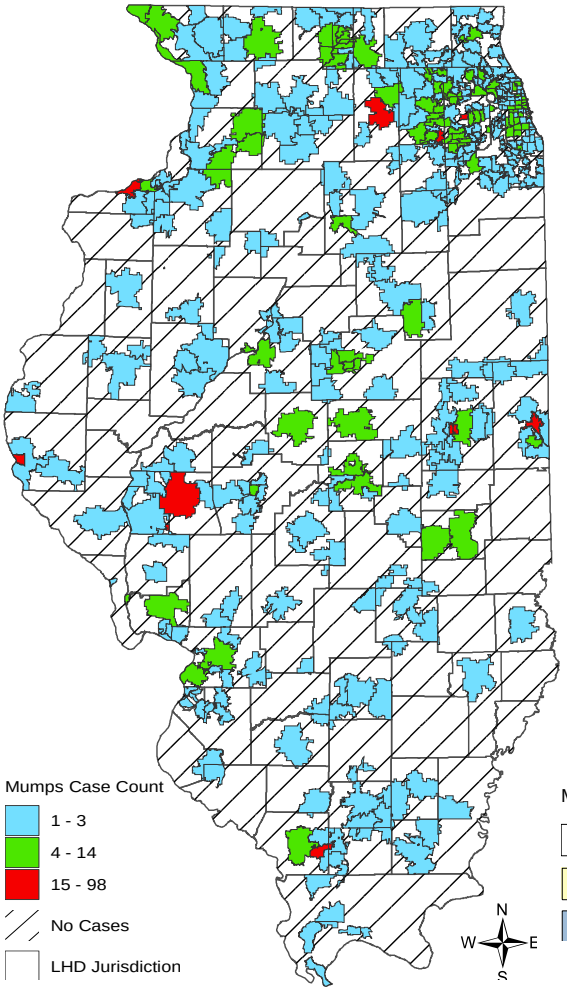
Data from the 2010 US. Census and the Illinois National Electronic Diseases Surveillance System (I-NEDSS) was analyzed using Microsoft Excel. ESRI's ArcGIS was used for mapping.

Notes

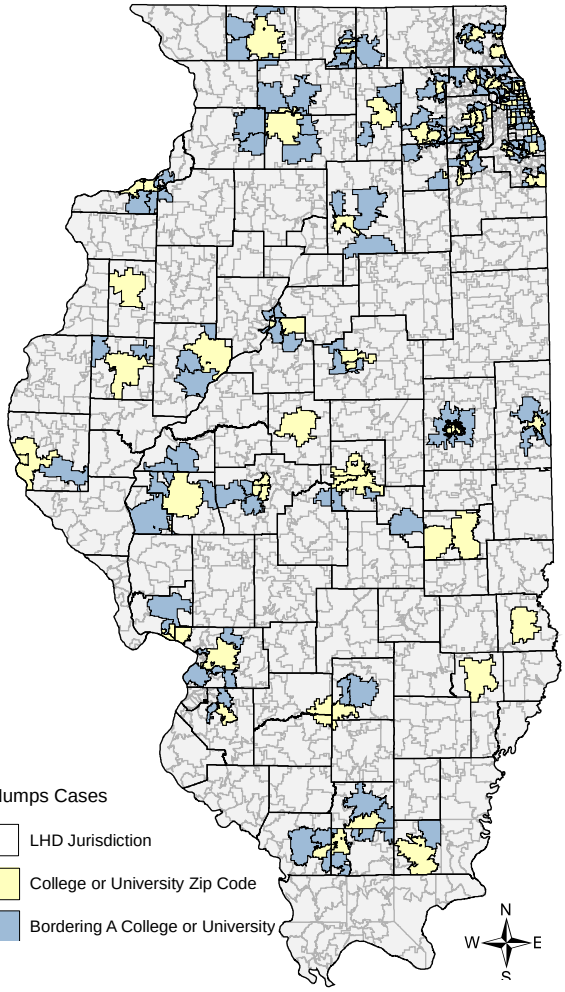
Colleges and Universities in other states bordering zip codes in Illinois with mumps cases were left out of the analysis.

Map 3 shows mumps cases by zip code in Illinois from 2006 to 2014. The map highlights the highest case counts in red (n=12 zip codes), the middle range in green (n=116 zip codes), and the lowest number of cases in blue (n=159 zip codes). Map 4 shows zip codes in yellow with a college or university and at least one mumps case, and the blue indicates zip codes with a mumps case that borders a college or university (combined n=277 zip codes).

Map 3. Mumps Cases by Zip Code, Illinois, 2006-2014[2]



Map 4. Mumps Cases in Zip Codes with, or Neighboring a College or University, Illinois, 2006-2014[2]



Combined, the maps compare the general distribution of mumps cases in Illinois by zip code to those in, or neighboring, a college or university. The large presence of cases in areas where colleges and universities are located and the high percentage of cases in the 18 to 22 year old age group demonstrates the importance of working with and educating colleges and universities of the need for prompt vaccination of students and case reporting, testing and implementation of control measures.