



# Vaccine-Preventable Diseases Reported in North Carolina, 2015

Controlling vaccine-preventable diseases (VPDs) requires the consistent, concerted and coordinated efforts of public health agencies and healthcare providers to rapidly identify and report suspected cases, and swiftly implement control measures. Although many VPDs are at or near record low levels, with the notable exception of pertussis, maintaining high immunization rates is still critical to prevent reemergence, as has been seen nationally with recent increases in pertussis, measles, and mumps cases. This annual surveillance report summarizes 12 VPDs reported in North Carolina during 2015 in the table below. Additional details about diseases for which cases were reported are presented on subsequent pages.

**Report Specifications.** Notable information about this report includes:

- Cases presented include those classified as confirmed or probable.
- Case counts are based on the earliest date of illness identification, typically onset date. Therefore, case counts in this report may differ from those included in national summaries, which can be based either on the earliest date of illness identification or on the date when cases were closed and reported to the Centers for Disease Control and Prevention.
- Unless otherwise noted, ages are based on date when the case was entered in the North Carolina Electronic Disease Surveillance System.
- Cases presented include only those for which public health investigation had been completed by April 5, 2016.
- Incidence rates are based on mid-year population estimates obtained from the North Carolina Office of State Budget and Management. Rates for 2015 were calculated using 2014 population estimates. The Hispanic population was estimated to be 9.0% of the total North Carolina population based on 2014 United States Census Bureau data.
- Note that estimates of rates based on a small number of cases are unstable and can fluctuate widely. Therefore, these estimates should be interpreted with caution. Ninety-five percent confidence intervals are shown for demographic-specific rates.
- The 12 VPDs summarized in this report are shown in the table below. Data for other VPDs reportable in North Carolina, including influenza and hepatitis B, are shown in separate reports.

**Surveillance Overview.** Two diseases increased significantly compared to the average of the previous five years (2010-2014):

*Haemophilus influenzae* invasive disease and tetanus. Only one case of invasive *H. influenzae* was attributable to type b, the only type that is covered by the vaccine. The number of pertussis cases dropped substantially when compared to the previous three years; 345 pertussis cases were reported, the lowest since 2011. No cases of diphtheria, measles, polio, rubella, or congenital rubella syndrome were reported.

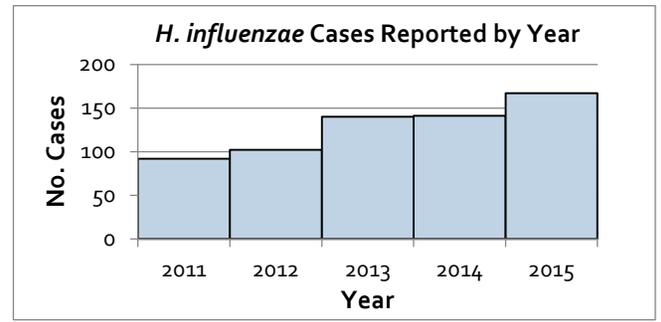
| <b>Number of Cases of VPDs Reported in North Carolina, 2010-2015</b> |             |             |             |             |             |                          |             |                            |
|--|-------------|-------------|-------------|-------------|-------------|--------------------------|-------------|----------------------------|
| <b>Disease</b>   | <b>2010</b> | <b>2011</b> | <b>2012</b> | <b>2013</b> | <b>2014</b> | <b>Five-year average</b> | <b>2015</b> | <b>Significant Change*</b> |
| Diphtheria   | 0           | 0           | 0           | 0           | 0           | 0                        | 0           | --                         |
| <i>Haemophilus influenzae</i> ,<br>invasive disease                  | 115         | 92          | 102         | 140         | 141         | 118                      | 167         | ↑                          |
| Hepatitis A  | 45          | 29          | 38          | 42          | 43          | 39                       | 38          | --                         |
| Measles  | 1           | 1           | 0           | 22          | 1           | 5                        | 0           | --                         |
| Meningococcal invasive disease                                       | 13          | 16          | 8           | 9           | 10          | 11                       | 5           | --                         |
| Mumps  | 11          | 9           | 2           | 4           | 2           | 6                        | 4           | --                         |
| Pertussis  | 289         | 206         | 626         | 625         | 785         | 506                      | 345         | --                         |
| Pneumococcal meningitis  | 32          | 24          | 39          | 35          | 35          | 35                       | 34          | --                         |
| Polio  | 0           | 0           | 0           | 0           | 0           | 0                        | 0           | --                         |
| Rubella  | 0           | 1           | 0           | 0           | 0           | 0                        | 0           | --                         |
| Congenital rubella syndrome  | 0           | 0           | 0           | 0           | 0           | 0                        | 0           | --                         |
| Tetanus  | 1           | 0           | 0           | 0           | 0           | 0                        | 3           | ↑                          |

\* ↑ = significant increase (≥ 2 standard deviations above average) ↓ = significant decrease (≥ 2 standard deviations below average) -- = no significant change

# Haemophilus influenzae , invasive disease, 2015

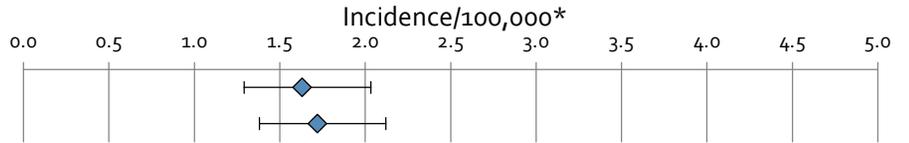
## Annual Summary

|                     | 2011              | 2012 | 2013 | 2014 | 2015 |     |
|---------------------|-------------------|------|------|------|------|-----|
| Incidence / 100,000 | 1.0               | 1.0  | 1.4  | 1.4  | 1.7  |     |
| No. cases           | 92                | 102  | 140  | 141  | 167  |     |
| Serotypes           | type b, <5 years  | 0%   | 0%   | 0%   | 0%   |     |
|                     | type b, ≥ 5 years | 0%   | 1%   | 2%   | 0%   | 1%  |
|                     | non-b, typeable   | 24%  | 20%  | 21%  | 24%  | 22% |
|                     | nontypeable       | 66%  | 70%  | 67%  | 65%  | 68% |
|                     | unknown           | 10%  | 10%  | 9%   | 10%  | 10% |

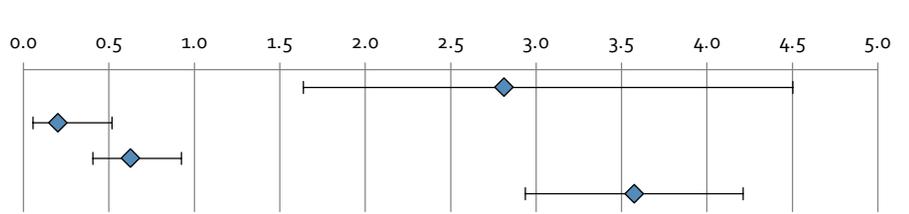


## Case Demographics, 2015

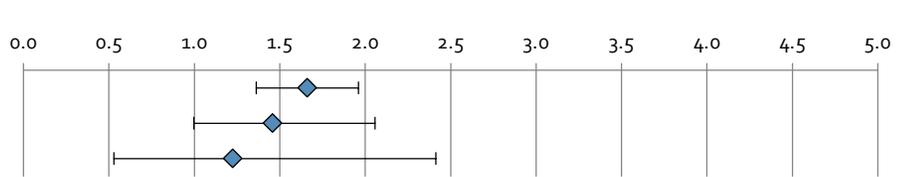
| Sex     | No. cases | % of total | Incidence/100,000 |
|---------|-----------|------------|-------------------|
| Male    | 79        | 47%        | 1.6               |
| Female  | 88        | 53%        | 1.7               |
| Unknown | 0         | 0%         | --                |



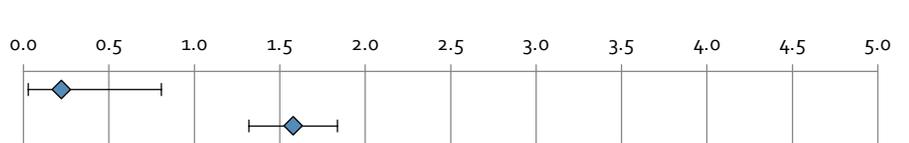
| Age Group    | No. cases | % of total | Incidence/100,000 |
|--------------|-----------|------------|-------------------|
| Under 5 yrs. | 17        | 10%        | 2.8               |
| 5-19 yrs.    | 4         | 2%         | 0.2               |
| 20-49 yrs.   | 25        | 15%        | 0.6               |
| 50+ yrs.     | 121       | 72%        | 3.6               |
| Unknown      | 0         | 0%         | --                |



| Race              | No. cases | % of total | Incidence/100,000 |
|-------------------|-----------|------------|-------------------|
| White             | 118       | 71%        | 1.7               |
| Black             | 32        | 19%        | 1.5               |
| Other or multiple | 8         | 5%         | 1.2               |
| Unknown           | 9         | 5%         | --                |



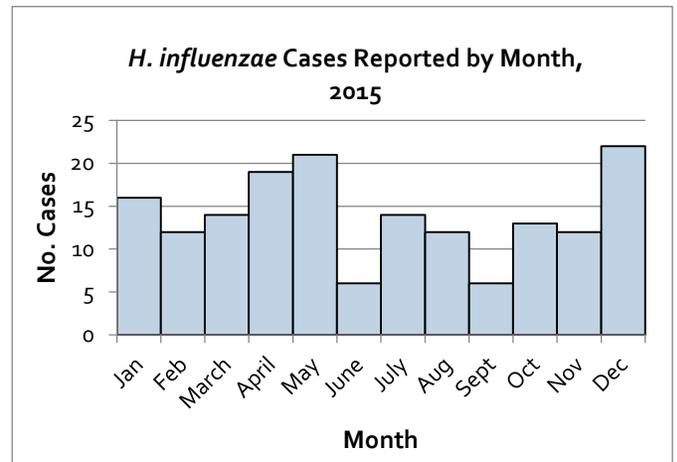
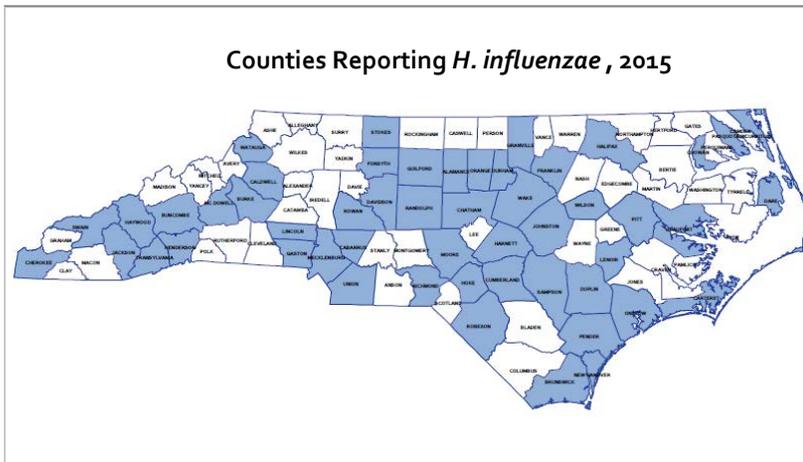
| Hispanic Ethnicity | No. cases | % of total | Incidence/100,000 |
|--------------------|-----------|------------|-------------------|
| Yes                | 2         | 1%         | 0.2               |
| No                 | 143       | 86%        | 1.6               |
| Unknown            | 22        | 13%        | --                |



\*Point estimates and 95% confidence intervals are shown

## Geographic Distribution

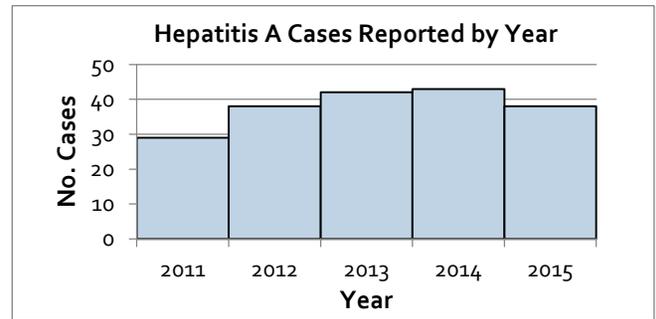
## Cases By Month



# Hepatitis A, 2015

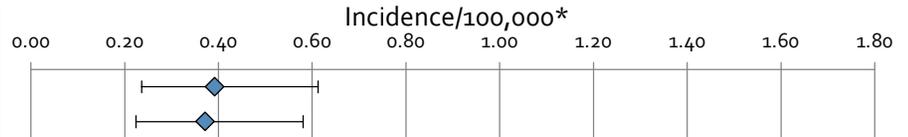
## Annual Summary

|                     | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------|------|------|------|------|------|
| Incidence / 100,000 | 0.30 | 0.39 | 0.43 | 0.43 | 0.38 |
| No. cases           | 29   | 38   | 42   | 43   | 38   |

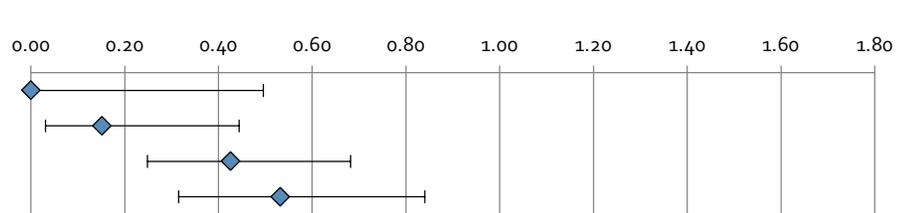


## Case Demographics, 2015

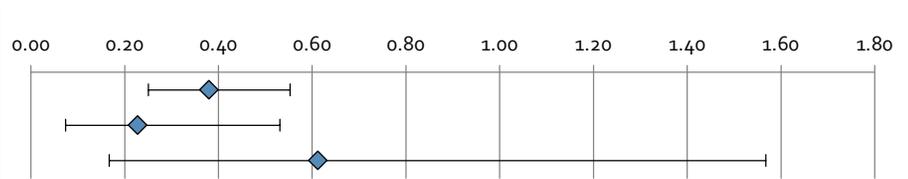
| Sex     | No. cases | % of total | Incidence/100,000 |
|---------|-----------|------------|-------------------|
| Male    | 19        | 50%        | 0.39              |
| Female  | 19        | 50%        | 0.37              |
| Unknown | 0         | 0%         | --                |



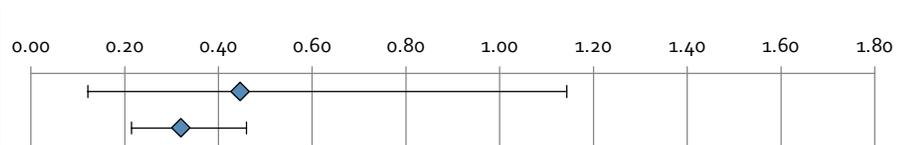
| Age Group    | No. cases | % of total | Incidence/100,000 |
|--------------|-----------|------------|-------------------|
| Under 5 yrs. | 0         | 0%         | 0.00              |
| 5-19 yrs.    | 3         | 8%         | 0.15              |
| 20-49 yrs.   | 17        | 45%        | 0.43              |
| 50+ yrs.     | 18        | 47%        | 0.53              |
| Unknown      | 0         | 0%         | --                |



| Race              | No. cases | % of total | Incidence/100,000 |
|-------------------|-----------|------------|-------------------|
| White             | 27        | 71%        | 0.38              |
| Black             | 5         | 13%        | 0.23              |
| Other or multiple | 4         | 11%        | 0.61              |
| Unknown           | 2         | 5%         | --                |



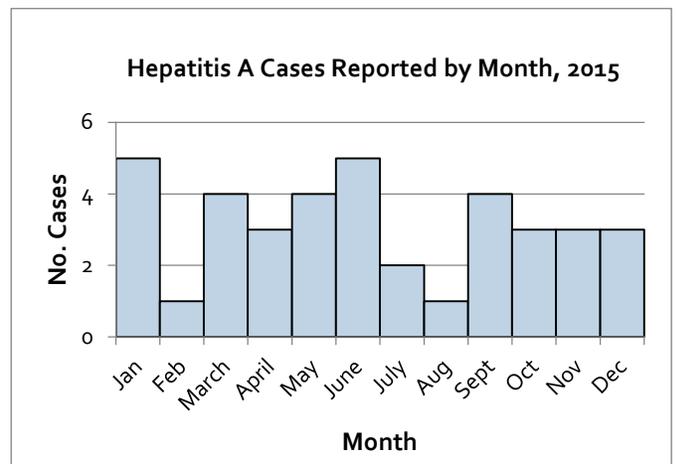
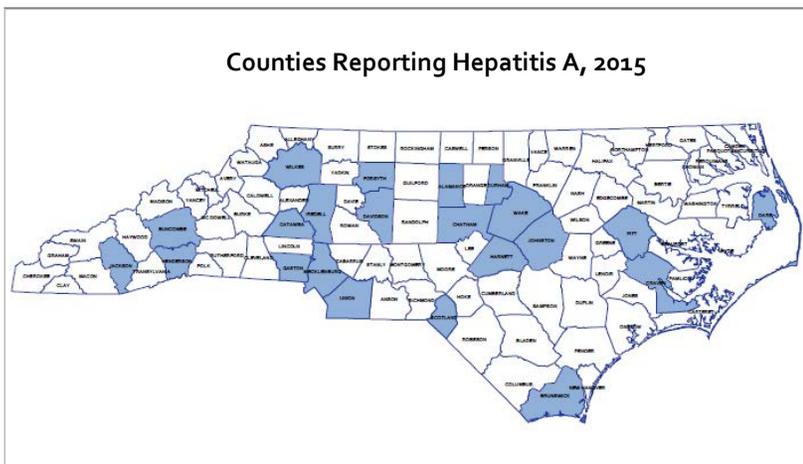
| Hispanic Ethnicity | No. cases | % of total | Incidence/100,000 |
|--------------------|-----------|------------|-------------------|
| Yes                | 4         | 11%        | 0.45              |
| No                 | 29        | 76%        | 0.32              |
| Unknown            | 5         | 13%        | --                |



\*Point estimates and 95% confidence intervals are shown

## Geographic Distribution

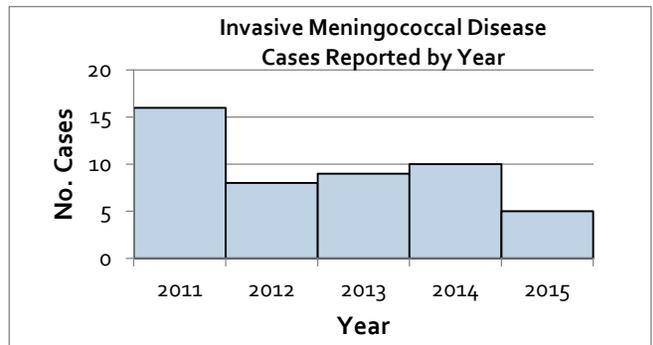
## Cases By Month



# Meningococcal Invasive Disease, 2015

## Annual Summary

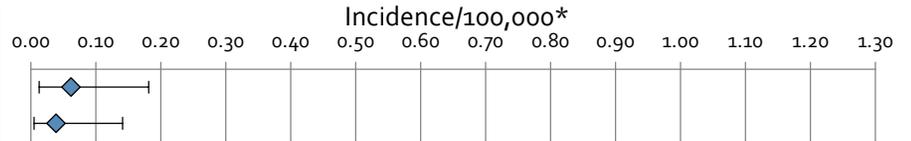
|                     | 2011    | 2012 | 2013 | 2014 | 2015 |     |
|---------------------|---------|------|------|------|------|-----|
| Incidence / 100,000 | 0.17    | 0.08 | 0.09 | 0.10 | 0.05 |     |
| No. of cases        | 16      | 8    | 9    | 10   | 5    |     |
| Serogroups          | A       | 6%   | 0%   | 0%   | 0%   | 0%  |
|                     | C       | 13%  | 13%  | 11%  | 10%  | 20% |
|                     | Y       | 50%  | 50%  | 33%  | 30%  | 0%  |
|                     | W-135   | 0%   | 0%   | 0%   | 10%  | 20% |
|                     | B       | 25%  | 25%  | 33%  | 40%  | 40% |
|                     | Unknown | 6%   | 13%  | 22%* | 10%  | 20% |



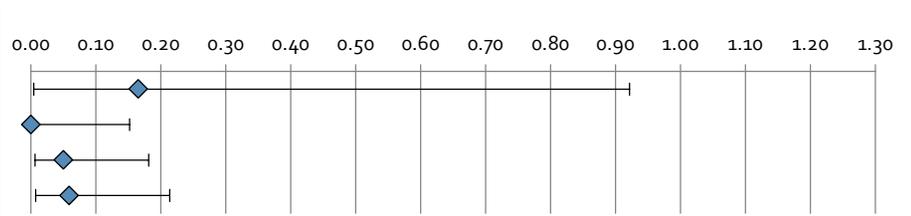
\*1 unknown, 1 could not distinguish between C & W-135

## Case Demographics, 2015

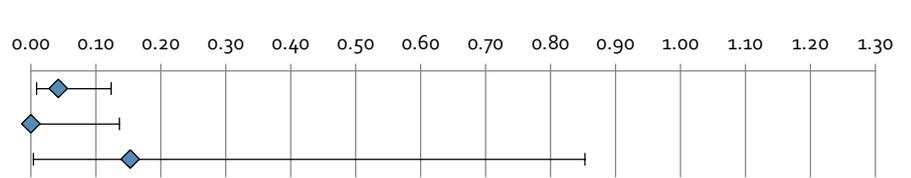
| Sex     | No. cases | % of total | Incidence/100,000 |
|---------|-----------|------------|-------------------|
| Male    | 3         | 60%        | 0.06              |
| Female  | 2         | 40%        | 0.04              |
| Unknown | 0         | 0%         | --                |



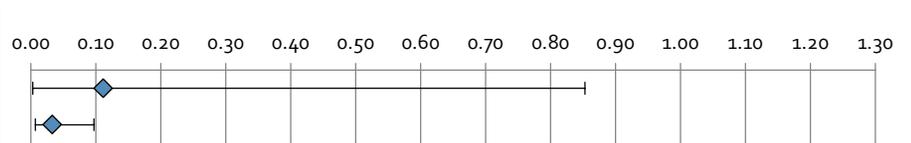
| Age Group    | No. cases | % of total | Incidence/100,000 |
|--------------|-----------|------------|-------------------|
| Under 5 yrs. | 1         | 20%        | 0.17              |
| 5-19 yrs.    | 0         | 0%         | 0.00              |
| 20-49 yrs.   | 2         | 40%        | 0.05              |
| 50+ yrs.     | 2         | 40%        | 0.06              |
| Unknown      | 0         | 0%         | --                |



| Race              | No. cases | % of total | Incidence/100,000 |
|-------------------|-----------|------------|-------------------|
| White             | 3         | 60%        | 0.04              |
| Black             | 0         | 0%         | 0.00              |
| Other or multiple | 1         | 20%        | 0.15              |
| Unknown           | 1         | 20%        | --                |



| Hispanic Ethnicity | No. cases | % of total | Incidence/100,000 |
|--------------------|-----------|------------|-------------------|
| Yes                | 1         | 20%        | 0.11              |
| No                 | 3         | 60%        | 0.03              |
| Unknown            | 1         | 20%        | --                |



\*Point estimates and 95% confidence intervals are shown

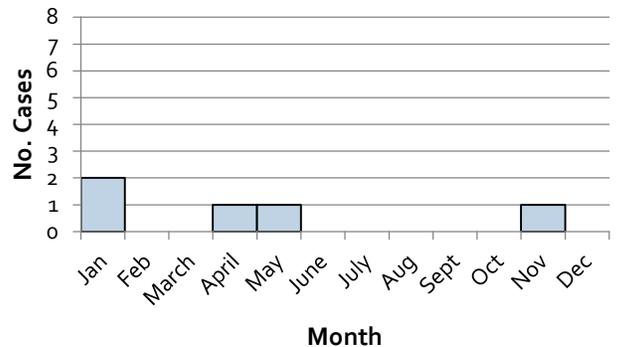
## Geographic Distribution

## Cases By Month

### Counties Reporting Invasive Meningococcal Disease, 2015

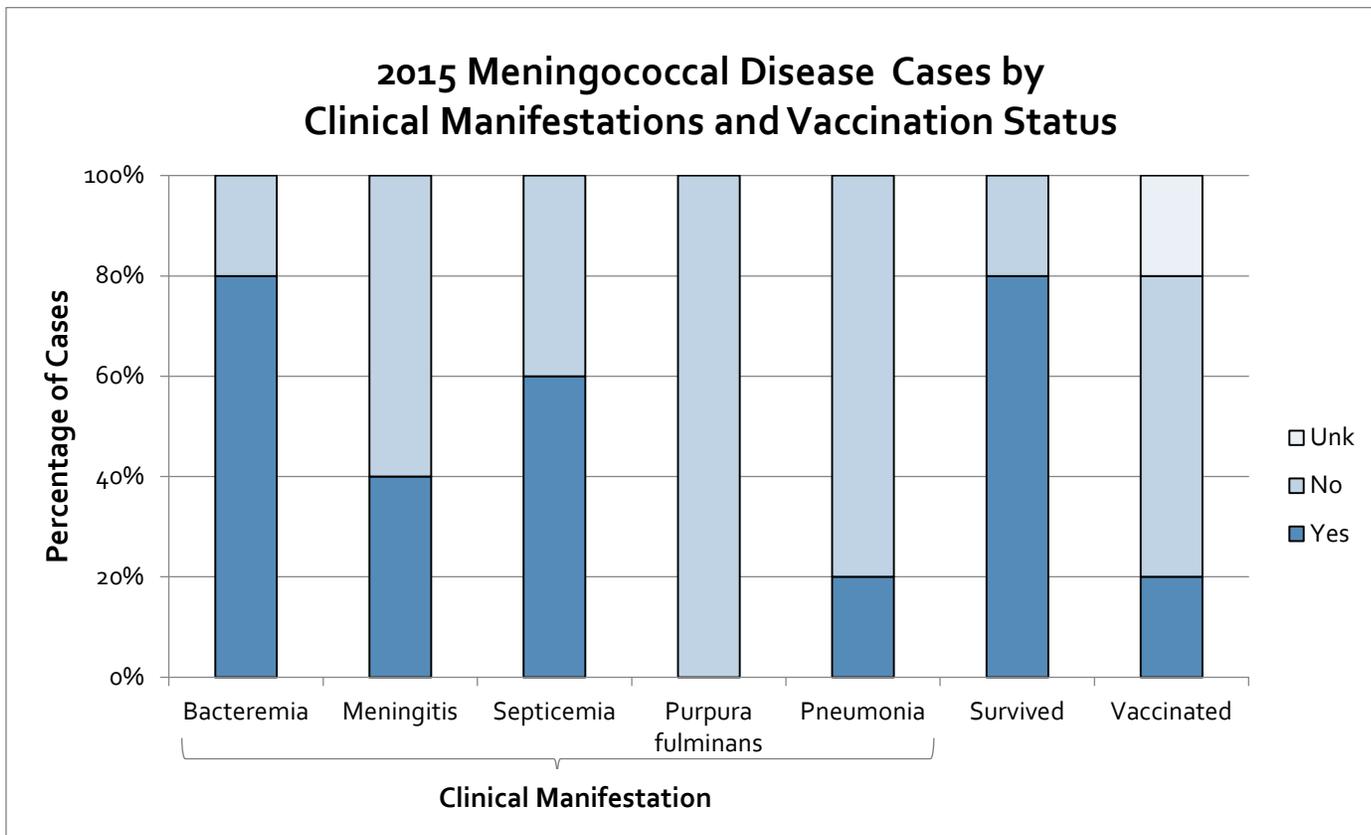


### Invasive Meningococcal Disease Cases Reported by Month, 2015

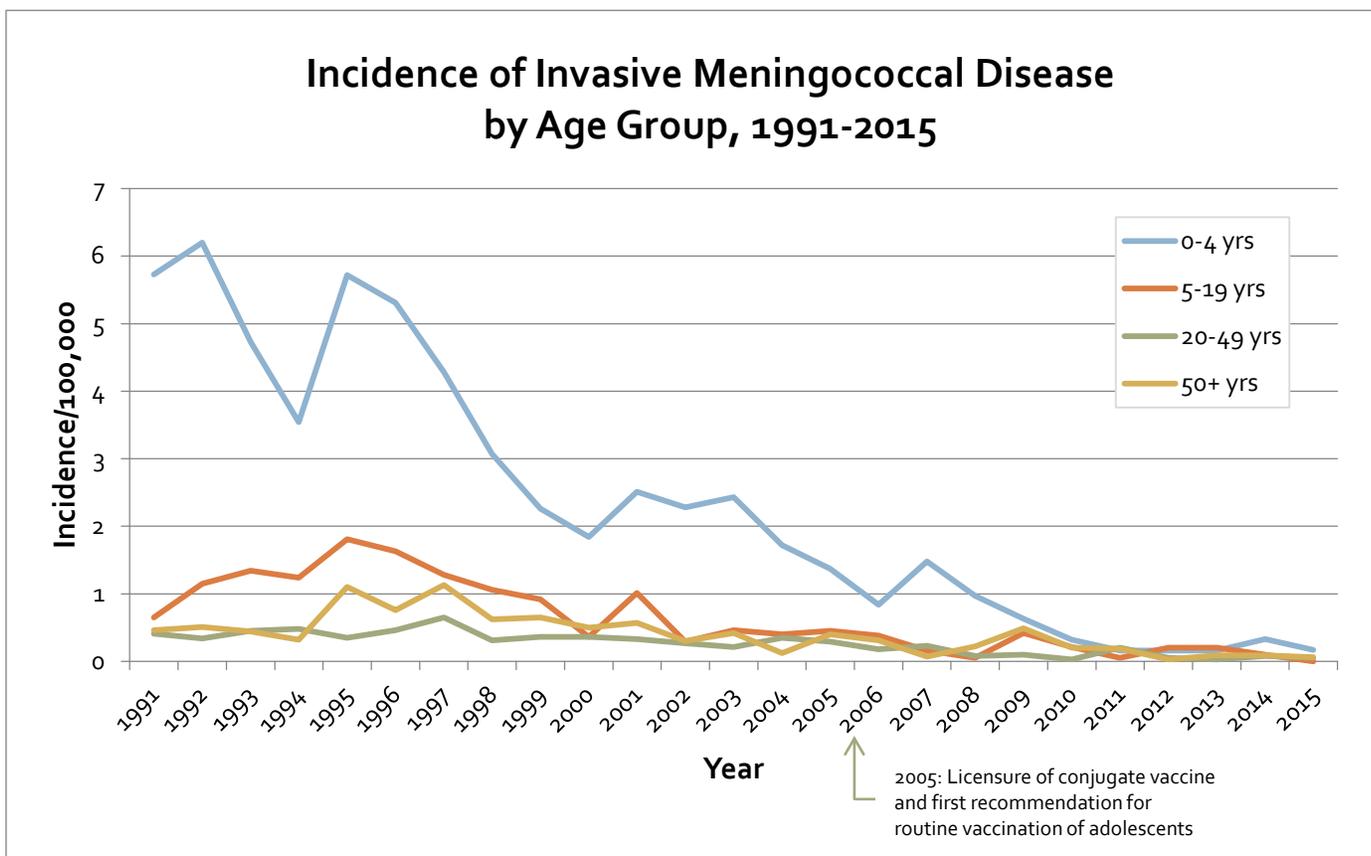


# Meningococcal Invasive Disease, 2015 (continued)

2015 Case Summary



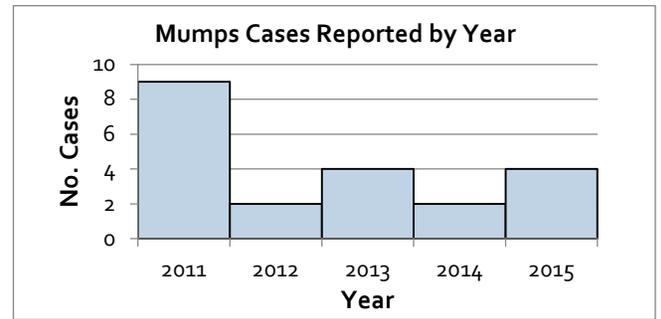
## Meningococcal Disease Incidence by Age Group



# Mumps, 2015

## Annual Summary

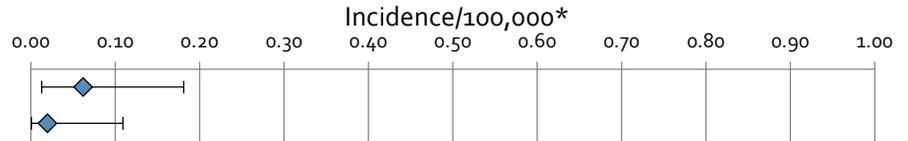
|  | 2011 | 2012 | 2013 | 2014 | 2015 |
|--|------|------|------|------|------|
| Incidence / 100,000                    | 0.09 | 0.02 | 0.04 | 0.02 | 0.04 |
| No. cases                              | 9    | 2    | 4    | 2    | 4    |
| Confirmed                              | 100% | 50%  | 0%   | 0%   | 0%   |
| Probable                               | 0%   | 50%  | 100% | 100% | 100% |
| Unvaccinated or unknown immune status* | 56%  | 50%  | 25%  | 100% | 0%   |



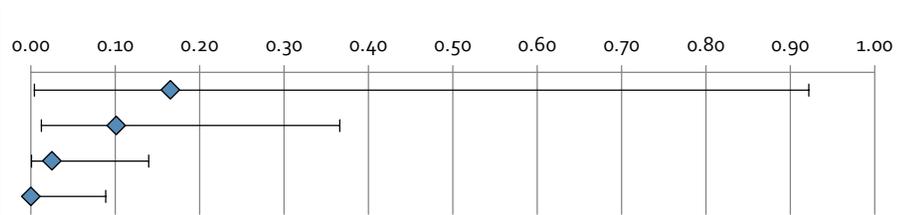
\*Cases born before 1957 are considered immune

## Case Demographics, 2015

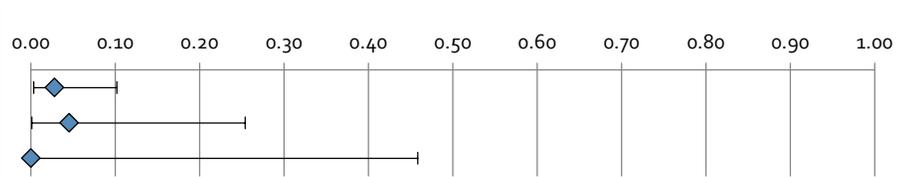
| Sex     | No. cases | % of total | Incidence/100,000 |
|---------|-----------|------------|-------------------|
| Male    | 3         | 75%        | 0.06              |
| Female  | 1         | 25%        | 0.02              |
| Unknown | 0         | 0%         | --                |



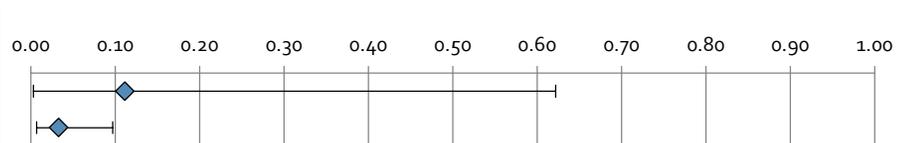
| Age Group    | No. cases | % of total | Incidence/100,000 |
|--------------|-----------|------------|-------------------|
| Under 5 yrs. | 1         | 25%        | 0.17              |
| 5-19 yrs.    | 2         | 50%        | 0.10              |
| 20-49 yrs.   | 1         | 25%        | 0.03              |
| 50+ yrs.     | 0         | 0%         | 0.00              |
| Unknown      | 0         | 0%         | --                |



| Race              | No. cases | % of total | Incidence/100,000 |
|-------------------|-----------|------------|-------------------|
| White             | 2         | 50%        | 0.03              |
| Black             | 1         | 25%        | 0.05              |
| Other or multiple | 0         | 0%         | 0.00              |
| Unknown           | 1         | 25%        | --                |



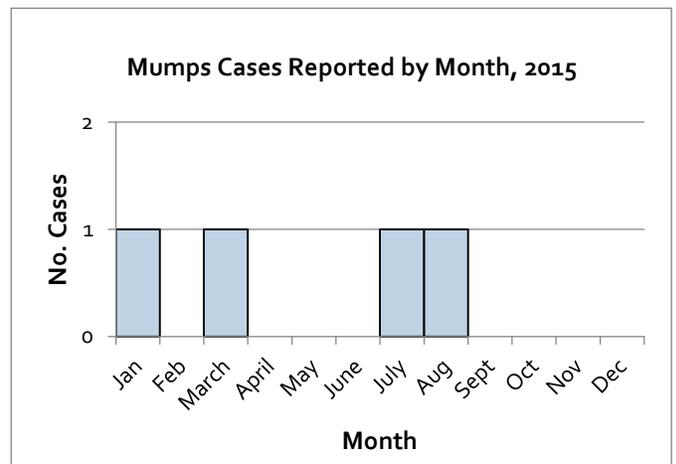
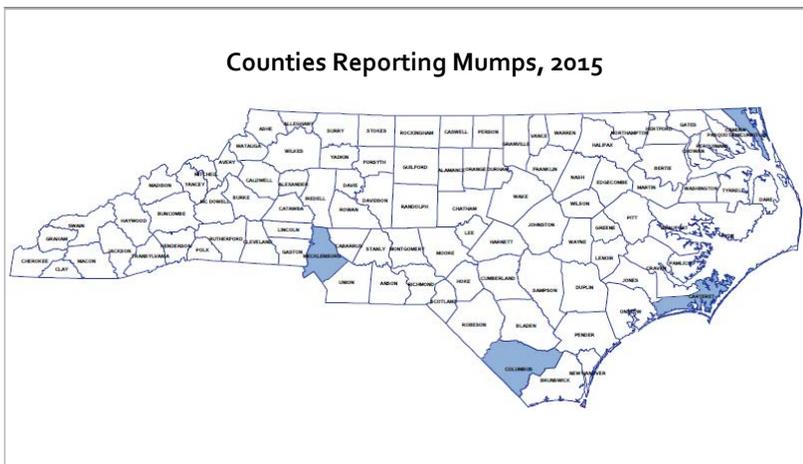
| Hispanic Ethnicity | No. cases | % of total | Incidence/100,000 |
|--------------------|-----------|------------|-------------------|
| Yes                | 1         | 25%        | 0.11              |
| No                 | 3         | 75%        | 0.03              |
| Unknown            | 0         | 0%         | --                |



\*Point estimates and 95% confidence intervals are shown

## Geographic Distribution

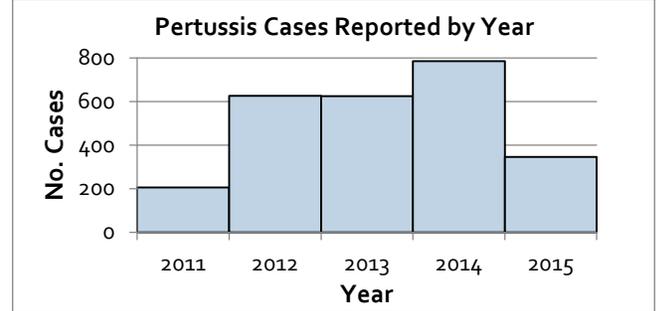
## Cases By Month



# Pertussis, 2015

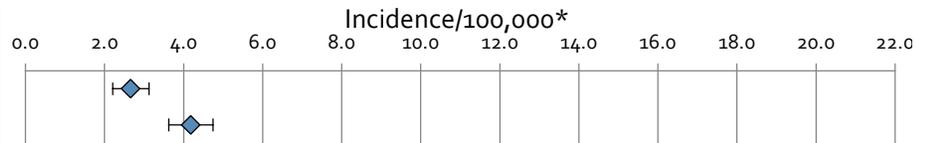
## Annual Summary

|                     | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------|------|------|------|------|------|
| Incidence / 100,000 | 2.1  | 6.4  | 6.3  | 7.9  | 3.5  |
| No. cases           | 206  | 626  | 625  | 785  | 345  |
| Culture confirmed   | 8%   | 11%  | 8%   | 7%   | 3%   |
| PCR confirmed       | 27%  | 42%  | 53%  | 44%  | 33%  |
| Epi-link confirmed  | 18%  | 11%  | 10%  | 14%  | 10%  |
| Probable            | 47%  | 37%  | 28%  | 35%  | 54%  |

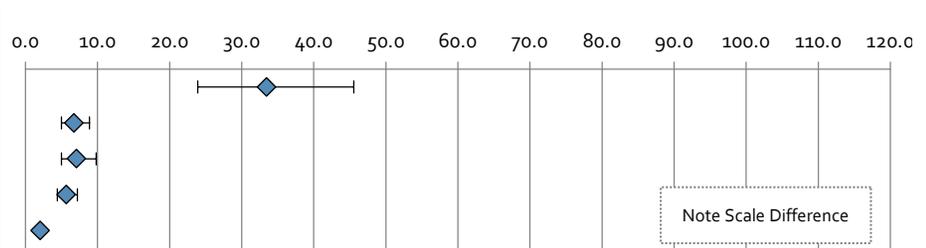


## Case Demographics, 2015

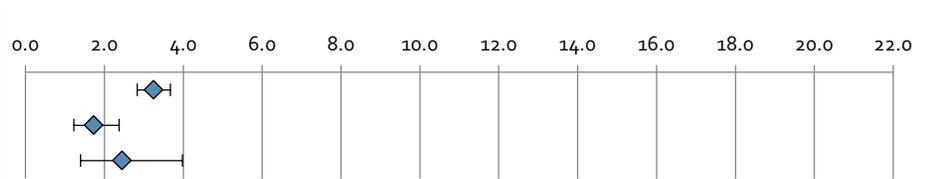
| Sex     | No. cases | % of total | Incidence/100,000 |
|---------|-----------|------------|-------------------|
| Male    | 129       | 37%        | 2.7               |
| Female  | 214       | 62%        | 4.2               |
| Unknown | 2         | 1%         | --                |



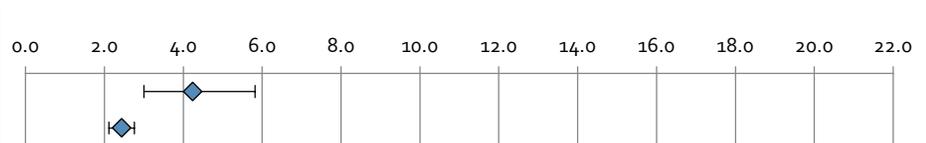
| Age Group        | No. cases | % of total | Incidence/100,000 |
|------------------|-----------|------------|-------------------|
| Infants (<1 yr.) | 40        | 12%        | 33.5              |
| 1-6 yrs.         | 50        | 14%        | 6.8               |
| 7-10 yrs.        | 37        | 11%        | 7.1               |
| 11-19 yrs.       | 68        | 20%        | 5.7               |
| 20+ yrs.         | 150       | 43%        | 2.0               |
| Unknown          | 0         | 0%         | --                |



| Race              | No. cases | % of total | Incidence/100,000 |
|-------------------|-----------|------------|-------------------|
| White             | 231       | 67%        | 3.3               |
| Black             | 38        | 11%        | 1.7               |
| Other or multiple | 16        | 5%         | 2.4               |
| Unknown           | 60        | 17%        | --                |



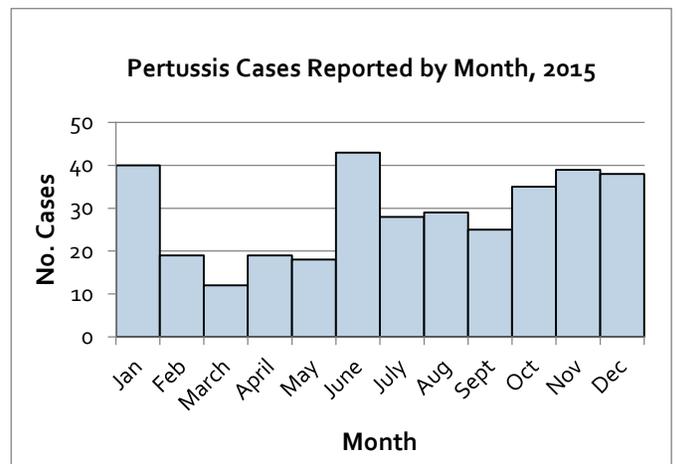
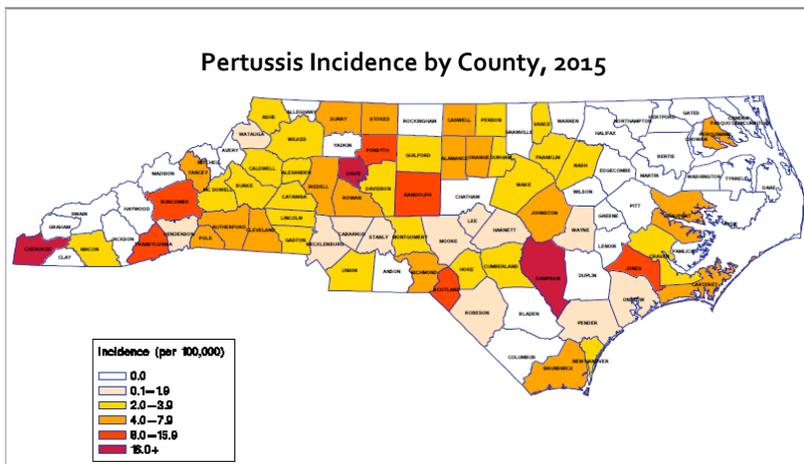
| Hispanic Ethnicity | No. cases | % of total | Incidence/100,000 |
|--------------------|-----------|------------|-------------------|
| Yes                | 38        | 11%        | 4.2               |
| No                 | 221       | 64%        | 2.4               |
| Unknown            | 86        | 25%        | --                |



\*Point estimates and 95% confidence intervals are shown

## Geographic Distribution

## Cases By Month

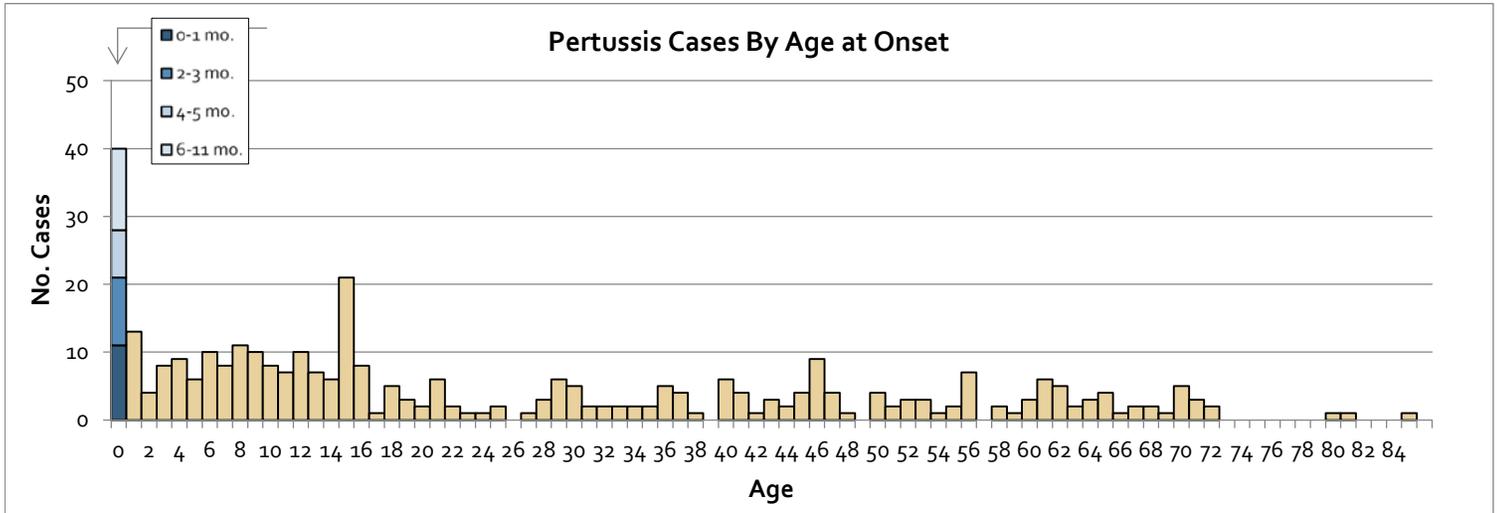


## Pertussis, 2015 (continued)

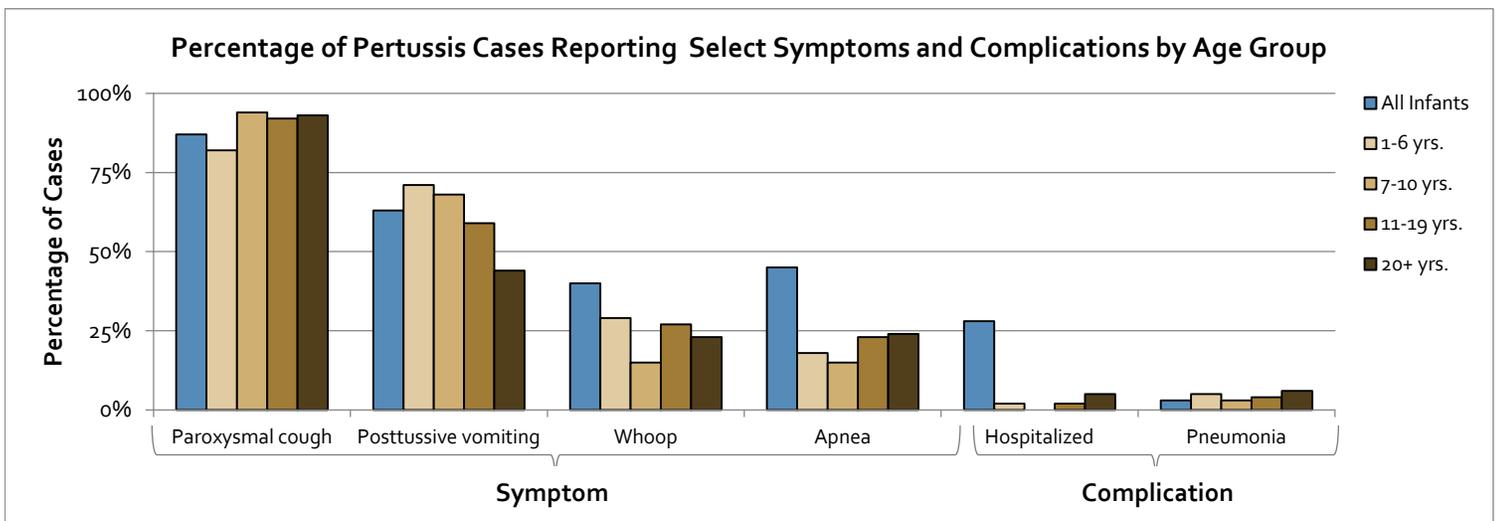
| Pertussis Cases by County and Month |     |     |     |     |     |     |     |     |     |     |     |     | Incidence |          |
|-------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------|----------|
| County                              | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total     | /100,000 |
| Davie County                        | .   | .   | .   | .   | .   | .   | .   | .   | .   | .   | 9   | 12  | 21        | 50.6     |
| Cherokee County                     | .   | .   | .   | .   | 1   | 7   | .   | .   | .   | .   | .   | .   | 8         | 29.1     |
| Sampson County                      | .   | 1   | 2   | 3   | 2   | 2   | .   | 1   | 2   | .   | .   | 1   | 14        | 21.7     |
| Transylvania County                 | 1   | 1   | 1   | 1   | .   | .   | .   | .   | 1   | .   | .   | .   | 5         | 15.0     |
| Scotland County                     | .   | .   | 1   | .   | 1   | 2   | .   | 1   | .   | .   | .   | .   | 5         | 13.9     |
| Buncombe County                     | 1   | .   | .   | 2   | .   | 2   | 3   | 6   | 5   | 4   | 5   | 3   | 31        | 12.3     |
| Jones County                        | .   | .   | .   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | 1         | 9.6      |
| Forsyth County                      | 1   | 1   | .   | .   | 7   | 7   | 4   | 4   | 1   | 1   | 1   | 6   | 33        | 9.1      |
| Randolph County                     | 2   | .   | 1   | 1   | .   | .   | 4   | .   | 3   | 1   | .   | .   | 12        | 8.4      |
| Perquimans County                   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | .   | .   | .   | 1         | 7.3      |
| Johnston County                     | 2   | 1   | 1   | .   | .   | .   | .   | 2   | 2   | 1   | 1   | 3   | 13        | 7.2      |
| Rowan County                        | .   | .   | .   | .   | .   | 1   | 1   | 1   | .   | .   | 5   | 2   | 10        | 7.2      |
| Alamance County                     | 1   | 2   | 1   | .   | .   | .   | .   | 1   | 1   | .   | 3   | 1   | 10        | 6.4      |
| Beaufort County                     | 2   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | .   | .   | 3         | 6.3      |
| Yancey County                       | .   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | .   | .   | 1         | 5.6      |
| Iredell County                      | .   | .   | .   | .   | .   | .   | 2   | 4   | 1   | 1   | .   | 1   | 9         | 5.4      |
| Surry County                        | 2   | .   | .   | .   | .   | 1   | .   | .   | .   | 1   | .   | .   | 4         | 5.4      |
| Brunswick County                    | .   | 1   | .   | 1   | 1   | .   | .   | .   | 2   | 1   | .   | .   | 6         | 5.1      |
| Cleveland County                    | .   | .   | .   | .   | 2   | 1   | 1   | .   | .   | .   | 1   | .   | 5         | 5.1      |
| Polk County                         | .   | .   | 1   | .   | .   | .   | .   | .   | .   | .   | .   | .   | 1         | 4.8      |
| Richmond County                     | .   | .   | .   | .   | .   | 1   | .   | .   | 1   | .   | .   | .   | 2         | 4.4      |
| Rutherford County                   | .   | .   | .   | 2   | .   | .   | 1   | .   | .   | .   | .   | .   | 3         | 4.4      |
| Carteret County                     | .   | .   | .   | 1   | .   | .   | 2   | .   | .   | .   | .   | .   | 3         | 4.3      |
| Orange County                       | .   | .   | 1   | .   | .   | 1   | 2   | 1   | .   | 1   | .   | .   | 6         | 4.3      |
| Stokes County                       | .   | .   | .   | .   | .   | 2   | .   | .   | .   | .   | .   | .   | 2         | 4.3      |
| Caswell County                      | .   | .   | .   | .   | 1   | .   | .   | .   | .   | .   | .   | .   | 1         | 4.2      |
| Craven County                       | 1   | .   | .   | .   | .   | 1   | .   | .   | .   | .   | 1   | 1   | 4         | 3.8      |
| Gaston County                       | 1   | .   | .   | .   | .   | 2   | .   | 1   | .   | 1   | 3   | .   | 8         | 3.8      |
| Ashe County                         | .   | .   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | .   | 1         | 3.6      |
| Montgomery County                   | .   | .   | .   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | 1         | 3.6      |
| Franklin County                     | .   | .   | .   | .   | .   | .   | 1   | 1   | .   | .   | .   | .   | 2         | 3.2      |
| New Hanover County                  | 1   | .   | .   | 1   | .   | 1   | .   | .   | .   | 1   | 2   | 1   | 7         | 3.2      |
| Davidson County                     | 1   | .   | .   | 1   | 1   | 2   | .   | .   | .   | .   | .   | .   | 5         | 3.0      |
| Macon County                        | .   | .   | .   | 1   | .   | .   | .   | .   | .   | .   | .   | .   | 1         | 2.9      |
| Wilkes County                       | .   | 1   | .   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | 2         | 2.9      |
| Union County                        | 1   | 1   | .   | .   | .   | 2   | .   | .   | .   | 2   | .   | .   | 6         | 2.8      |
| Guilford County                     | 9   | 1   | 1   | .   | .   | .   | .   | 1   | .   | .   | 1   | 1   | 14        | 2.7      |
| Alexander County                    | .   | .   | .   | .   | .   | 1   | .   | .   | .   | .   | .   | .   | 1         | 2.6      |
| Catawba County                      | .   | .   | .   | .   | .   | 1   | .   | .   | .   | .   | 3   | .   | 4         | 2.6      |
| Lincoln County                      | .   | 1   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | .   | 2         | 2.5      |
| Person County                       | .   | .   | 1   | .   | .   | .   | .   | .   | .   | .   | .   | .   | 1         | 2.5      |
| Wake County                         | 7   | 2   | .   | 1   | 1   | 2   | 1   | .   | 1   | 6   | 1   | 3   | 25        | 2.5      |
| Caldwell County                     | .   | .   | .   | 1   | .   | .   | .   | .   | 1   | .   | .   | .   | 2         | 2.4      |
| Cumberland County                   | 1   | 2   | .   | .   | 1   | 2   | .   | 1   | 1   | .   | .   | .   | 8         | 2.4      |
| Burke County                        | 1   | .   | .   | .   | .   | .   | .   | .   | .   | .   | .   | 1   | 2         | 2.2      |
| McDowell County                     | .   | .   | .   | .   | .   | 1   | .   | .   | .   | .   | .   | .   | 1         | 2.2      |
| Vance County                        | .   | .   | .   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | 1         | 2.2      |
| Durham County                       | .   | .   | .   | 1   | .   | .   | 1   | .   | .   | 4   | .   | .   | 6         | 2.0      |
| Nash County                         | .   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | .   | 1   | 2         | 2.1      |
| Hoke County                         | .   | .   | .   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | 1         | 2.0      |
| Watauga County                      | 1   | .   | .   | .   | .   | .   | .   | .   | .   | .   | .   | .   | 1         | 1.9      |
| Pender County                       | .   | .   | .   | .   | .   | 1   | .   | .   | .   | .   | .   | .   | 1         | 1.8      |
| Lee County                          | .   | .   | 1   | .   | .   | .   | .   | .   | .   | .   | .   | .   | 1         | 1.7      |
| Stanly County                       | 1   | .   | .   | .   | .   | .   | .   | .   | .   | .   | .   | .   | 1         | 1.6      |
| Wayne County                        | 1   | .   | .   | .   | .   | .   | 1   | .   | .   | .   | .   | .   | 2         | 1.6      |
| Robeson County                      | .   | .   | .   | 1   | .   | .   | .   | .   | .   | 1   | .   | .   | 2         | 1.5      |
| Mecklenburg County                  | 1   | 3   | .   | 1   | .   | .   | 2   | 1   | .   | 2   | 3   | 1   | 14        | 1.4      |
| Moore County                        | 1   | .   | .   | .   | .   | .   | .   | .   | .   | .   | .   | .   | 1         | 1.1      |
| Onslow County                       | .   | 1   | .   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | 2         | 1.0      |
| Henderson County                    | .   | .   | .   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | 1         | 0.9      |
| Harnett County                      | .   | .   | .   | .   | .   | .   | 1   | .   | .   | .   | .   | .   | 1         | 0.8      |
| Cabarrus County                     | .   | .   | .   | .   | .   | .   | .   | .   | 1   | .   | .   | .   | 1         | 0.5      |
| North Carolina                      | 40  | 19  | 12  | 19  | 18  | 43  | 28  | 29  | 25  | 35  | 39  | 38  | 345       | 3.5      |

# Pertussis, 2015 (continued)

## Age Distribution



| Clinical Information                            |                   |         |         |          |             |          |           |            |          |          |
|---|-------------------|---------|---------|----------|-------------|----------|-----------|------------|----------|----------|
|   | Infant Age Groups |         |         |          | Age Groups  |          |           |            |          | All Ages |
|   | 0-1 mo.           | 2-3 mo. | 4-5 mo. | 6-11 mo. | All Infants | 1-6 yrs. | 7-10 yrs. | 11-19 yrs. | 20+ yrs. |          |
| No. cases                                       | 11                | 10      | 7       | 12       | 40          | 50       | 37        | 68         | 150      | 345      |
| Symptoms (No. cases, % of known responses)      |                   |         |         |          |             |          |           |            |          |          |
| Paroxysmal cough                                | 7 64%             | 10 100% | 7 100%  | 10 91%   | 34 87%      | 40 82%   | 33 94%    | 61 92%     | 136 93%  | 304 90%  |
| Posttussive vomiting                            | 6 55%             | 5 50%   | 5 71%   | 9 75%    | 25 63%      | 35 71%   | 25 68%    | 37 59%     | 65 44%   | 187 56%  |
| Whoop   | 4 40%             | 2 25%   | 2 29%   | 6 60%    | 14 40%      | 14 29%   | 5 15%     | 17 27%     | 32 23%   | 82 26%   |
| Apnea   | 7 64%             | 5 56%   | 1 14%   | 4 36%    | 17 45%      | 9 18%    | 5 15%     | 14 23%     | 33 24%   | 78 25%   |
| Complications (No. cases, % of known responses) |                   |         |         |          |             |          |           |            |          |          |
| Hospitalized                                    | 8 73%             | 3 30%   | 0 0%    | 0 0%     | 11 28%      | 1 2%     | 0 0%      | 1 2%       | 7 5%     | 20 6%    |
| Pneumonia                                       | 0 0%              | 1 14%   | 0 0%    | 0 0%     | 1 3%        | 2 5%     | 1 3%      | 2 4%       | 8 6%     | 14 5%    |
| Seizures  | 0 0%              | 0 0%    | 0 0%    | 0 0%     | 0 0%        | 0 0%     | 0 0%      | 0 0%       | 0 0%     | 0 0%     |
| Encephalopathy                                  | 0 0%              | 0 0%    | 0 0%    | 0 0%     | 0 0%        | 0 0%     | 0 0%      | 0 0%       | 0 0%     | 0 0%     |
| Died  | 0 0%              | 0 0%    | 0 0%    | 0 0%     | 0 0%        | 0 0%     | 0 0%      | 0 0%       | 0 0%     | 0 0%     |



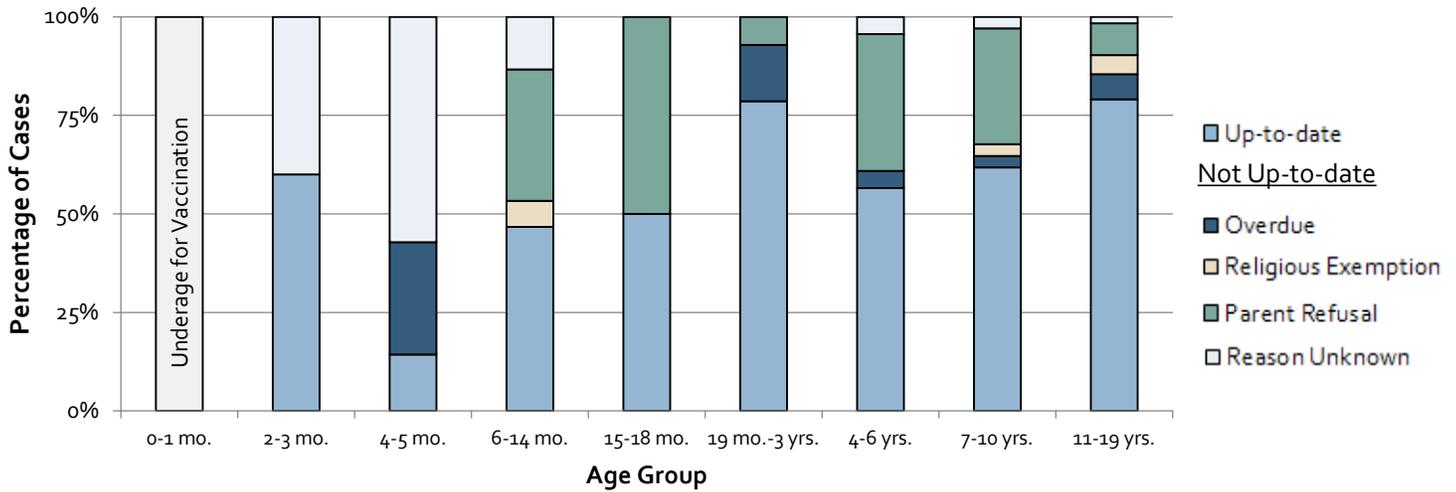
# Pertussis, 2015 (continued)

## Vaccination Status of Children and Adolescents by Age Group\*

| Age Group   | 0-1 mo.  |      | 2-3 mo. |      | 4-5 mo. |     | 6-14 mo. |     | 15-18 mo. |      | 19 mo.-3 yrs. |     | 4-6 yrs. |     | 7-10 yrs. |     | 11-19 yrs. |     |
|---|----------|------|---------|------|---------|-----|----------|-----|-----------|------|---------------|-----|----------|-----|-----------|-----|------------|-----|
| No. of cases  | 11       |      | 10      |      | 7       |     | 15       |     | 6         |      | 16            |     | 25       |     | 38        |     | 67         |     |
| Vaccine Type  | DTaP/DTP |      |         |      |         |     |          |     |           |      |               |     |          |     |           |     | Tdap       |     |
| Expected doses  | 0        |      | 1       |      | 2       |     | 3        |     | 3-4       |      | 4             |     | 4-5      |     | 5†        |     | 1+         |     |
| <i>Documented doses of pertussis-containing vaccine</i> |          |      |         |      |         |     |          |     |           |      |               |     |          |     |           |     |            |     |
| 0   | 11       | 100% | 4       | 40%  | 2       | 29% | 6        | 40% | 2         | 33%  | 2             | 13% | 8        | 32% | 11        | 29% | 13         | 19% |
| 1   |          |      | 6       | 60%  | 4       | 57% | 0        | 0%  | 1         | 17%  | 0             | 0%  | 0        | 0%  | 0         | 0%  | 48         | 72% |
| 2   |          |      |         |      | 1       | 14% | 2        | 13% | 0         | 0%   | 0             | 0%  | 0        | 0%  | 0         | 0%  | 1          | 1%  |
| 3   |          |      |         |      |         |     | 7        | 47% | 3         | 50%  | 1             | 6%  | 2        | 8%  | 1         | 3%  |            |     |
| 4   |          |      |         |      |         |     |          |     | 0         | 0%   | 11            | 69% | 3        | 12% | 1         | 3%  |            |     |
| 5+  |          |      |         |      |         |     |          |     |           |      |               |     | 10       | 40% | 21        | 55% |            |     |
| Unknown   | 0        | 0%   | 0       | 0%   | 0       | 0%  | 0        | 0%  | 0         | 0%   | 2             | 13% | 2        | 8%  | 4         | 11% | 5          | 7%  |
| <i>Up-to-date (of known status)</i>                     |          |      |         |      |         |     |          |     |           |      |               |     |          |     |           |     |            |     |
| Yes   |          |      | 6       | 60%  | 1       | 14% | 7        | 47% | 3         | 50%  | 11            | 79% | 13       | 57% | 21        | 62% | 49         | 79% |
| No  |          |      | 4       | 40%  | 6       | 86% | 8        | 53% | 3         | 50%  | 3             | 21% | 10       | 43% | 13        | 38% | 13         | 21% |
| Overdue   |          |      | 0       | 0%   | 2       | 33% | 0        | 0%  | 0         | 0%   | 2             | 67% | 1        | 10% | 1         | 8%  | 4          | 31% |
| Religious Exemption                                     |          |      | 0       | 0%   | 0       | 0%  | 1        | 13% | 0         | 0%   | 0             | 0%  | 0        | 0%  | 1         | 8%  | 3          | 23% |
| Parent Refusal  |          |      | 0       | 0%   | 0       | 0%  | 5        | 63% | 3         | 100% | 1             | 33% | 8        | 80% | 10        | 77% | 5          | 38% |
| Unknown   |          |      | 4       | 100% | 4       | 67% | 2        | 25% | 0         | 0%   | 0             | 0%  | 1        | 10% | 1         | 8%  | 1          | 8%  |

\*Vaccination data were provided by the NC Immunization Branch. Vaccination history was obtained using documentation provided in NC EDSS or in the North Carolina Immunization Registry. Ages are based on date of symptom onset. †A child aged 7 through 10 years is considered up-to-date if he/she has received five valid DTaP/DTP doses or if his/her fourth DTaP/DTP dose was given on or after the fourth birthday

**Percentage of Pertussis Cases by Up-to-date Status and Reason Not Up-to-date by Age Group, North Carolina, 2015**



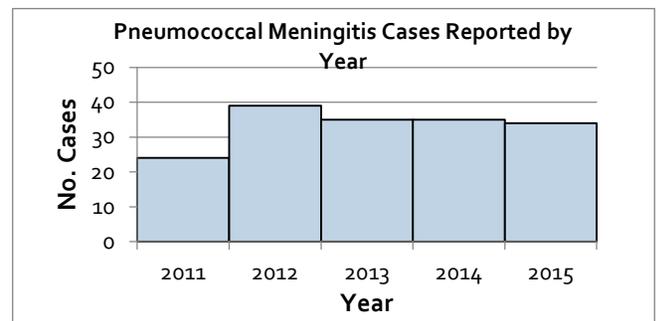
## Maternal Tdap (for infant cases <1 year of age)

| Mother Received Tdap in Association with Case Pregnancy | No. cases | % of total  |
|---|-----------|-------------|
| Yes, during pregnancy                                   | 6         | 15%         |
| Yes, postpartum   | 6         | 15%         |
| No  | 18        | 45%         |
| Unknown   | 10        | 25%         |
| <b>Total</b>  | <b>40</b> | <b>100%</b> |

# Pneumococcal Meningitis, 2015

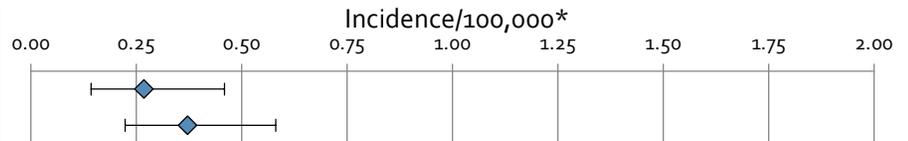
## Annual Summary

|   | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|------|------|------|------|------|
| Incidence / 100,000                                       | 0.25 | 0.40 | 0.35 | 0.35 | 0.34 |
| No. cases   | 24   | 39   | 35   | 35   | 34   |
| <5 yrs.   | 4%   | 13%  | 6%   | 9%   | 12%  |
| ≥ 5 yrs.  | 96%  | 85%  | 94%  | 91%  | 88%  |
| Unvaccinated or unknown vaccination status (<5 yrs. only) | 100% | 20%  | 0%   | 67%  | 25%  |

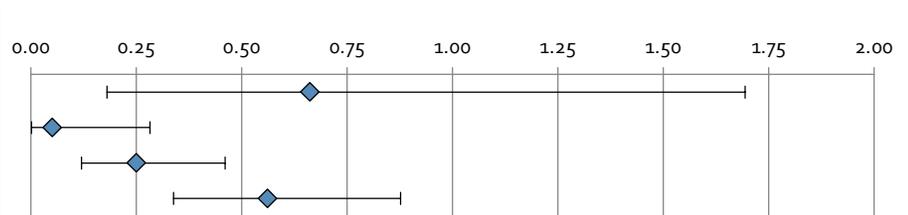


## Case Demographics, 2015

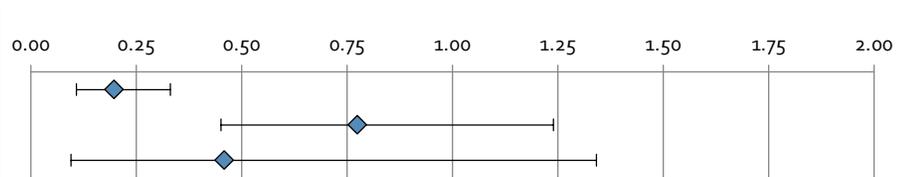
| Sex     | No. cases | % of total | Incidence/100,000 |
|---------|-----------|------------|-------------------|
| Male    | 13        | 38%        | 0.27              |
| Female  | 19        | 56%        | 0.37              |
| Unknown | 2         | 6%         | --                |



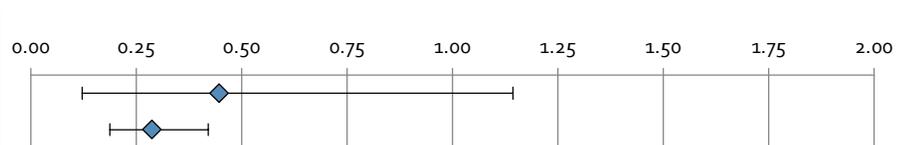
| Age Group    | No. cases | % of total | Incidence/100,000 |
|--------------|-----------|------------|-------------------|
| Under 5 yrs. | 4         | 12%        | 0.66              |
| 5-19 yrs.    | 1         | 3%         | 0.05              |
| 20-49 yrs.   | 10        | 29%        | 0.25              |
| 50+ yrs.     | 19        | 56%        | 0.56              |
| Unknown      | 0         | 0%         | --                |



| Race              | No. cases | % of total | Incidence/100,000 |
|-------------------|-----------|------------|-------------------|
| White             | 14        | 41%        | 0.20              |
| Black             | 17        | 50%        | 0.77              |
| Other or multiple | 3         | 9%         | 0.46              |
| Unknown           | 0         | 0%         | --                |



| Hispanic Ethnicity | No. cases | % of total | Incidence/100,000 |
|--------------------|-----------|------------|-------------------|
| Yes                | 4         | 12%        | 0.45              |
| No                 | 26        | 76%        | 0.29              |
| Unknown            | 4         | 12%        | --                |



\*Point estimates and 95% confidence intervals are shown

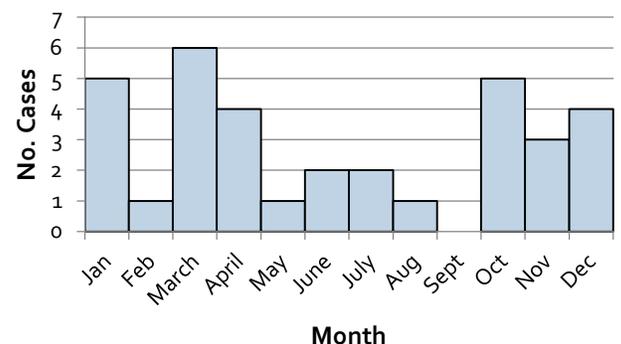
## Geographic Distribution

## Cases By Month

Counties Reporting Pneumococcal Meningitis, 2015



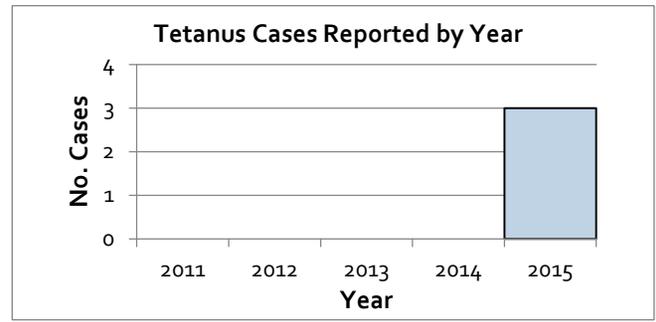
Pneumococcal Meningitis Cases Reported by Month, 2015



# Tetanus, 2015

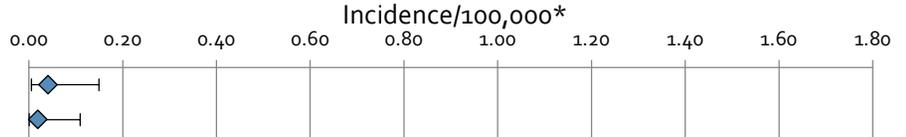
## Annual Summary

|                     | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------|------|------|------|------|------|
| Incidence / 100,000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 |
| No. cases           | 0    | 0    | 0    | 0    | 3    |

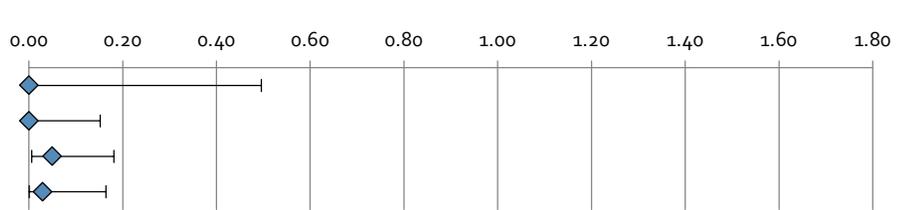


## Case Demographics, 2015

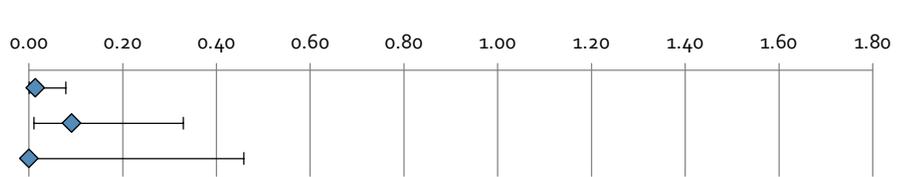
| Sex     | No. cases | % of total | Incidence/100,000 |
|---------|-----------|------------|-------------------|
| Male    | 2         | 67%        | 0.04              |
| Female  | 1         | 33%        | 0.02              |
| Unknown | 0         | 0%         | --                |



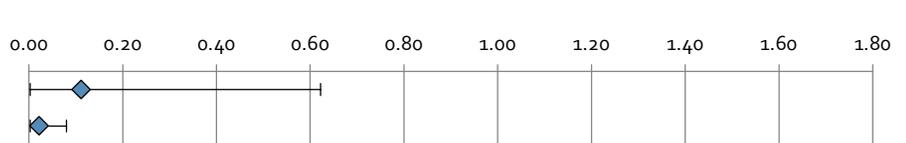
| Age Group    | No. cases | % of total | Incidence/100,000 |
|--------------|-----------|------------|-------------------|
| Under 5 yrs. | 0         | 0%         | 0.00              |
| 5-19 yrs.    | 0         | 0%         | 0.00              |
| 20-49 yrs.   | 2         | 67%        | 0.05              |
| 50+ yrs.     | 1         | 33%        | 0.03              |
| Unknown      | 0         | 0%         | --                |



| Race              | No. cases | % of total | Incidence/100,000 |
|-------------------|-----------|------------|-------------------|
| White             | 1         | 33%        | 0.01              |
| Black             | 2         | 67%        | 0.09              |
| Other or multiple | 0         | 0%         | 0.00              |
| Unknown           | 0         | 0%         | --                |



| Hispanic Ethnicity | No. cases | % of total | Incidence/100,000 |
|--------------------|-----------|------------|-------------------|
| Yes                | 1         | 33%        | 0.11              |
| No                 | 2         | 67%        | 0.02              |
| Unknown            | 0         | 0%         | --                |



\*Point estimates and 95% confidence intervals are shown

## Geographic Distribution

## Cases By Month

