

Vaccine-Preventable Disease Surveillance

April 2018

Summary

Pertussis

- Pertussis activity increased slightly from last month and is consistent with trends seen in previous years at this time.
- There were 22 cases reported in April.
- There were 2 outbreaks reported in schools in April.
- Incidence remains highest among infants less than one year old; infants less than two months old are too young to receive vaccinations against pertussis, which is why vaccination of other age groups is so important to help prevent infection in this highly vulnerable group.
- For clinicians: a new study emphasizes the importance of pertussis vaccination in school-aged children to reduce the burden of disease. See [page 2](#) for study details and [page 11](#) for a link to the study.

Varicella

- Varicella activity stayed consistent from last month and remained slightly higher than activity levels seen in previous years at this time.
- There were 71 total cases and no outbreaks reported in April. The most recent outbreak was reported in March in a school with 19 total cases.
- Incidence remains highest among infants less than one year old, who are too young to be vaccinated.
- This month, 64% of cases were not up to date on their varicella vaccinations or had unknown vaccination status, an increase from last month.

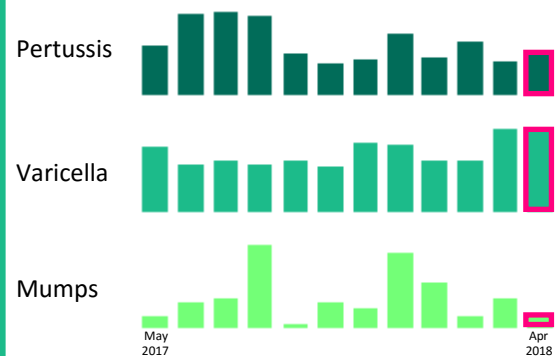
Mumps

- Mumps activity decreased from last month and is consistent with activity levels seen in previous years at this time.
- There were 2 confirmed and 1 probable case and no outbreaks reported in April.
- Incidence was highest among children age 6-11 years old.

Table of Contents

Pertussis Surveillance	2
Varicella Surveillance	5
Mumps Surveillance	8
Surveillance System Summary.....	11

Monthly Activity Trends May 2017-Apr. 2018



For all vaccine-preventable diseases, timely and complete vaccination is the best way to prevent infection. In general, those who are at least partially vaccinated against a disease, even if they later develop that disease, have less severe outcomes than those who have never been vaccinated.

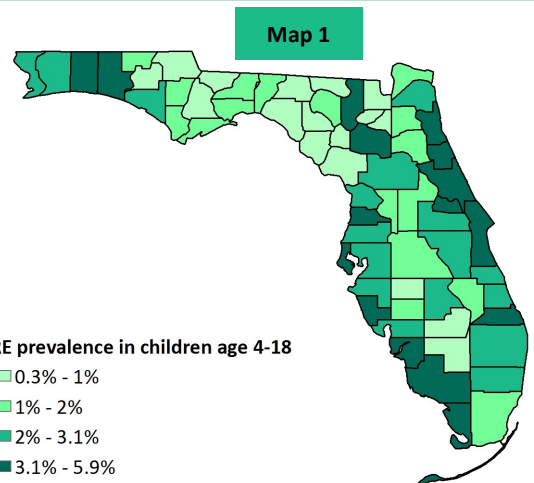
Vaccination

Map 1 shows the prevalence of children age 4-18 who have a registered religious exemption (RE) to vaccination in Florida SHOTS* as of May 1, 2018.

Statewide, the estimated prevalence of REs among children age 4-18 is 2.7% with individual counties ranging from 0.3% to 5.9%. This is an increase from May 1, 2017 when the statewide prevalence was 2.3% and individual counties ranged from 0.2% to 5.1%.

Unvaccinated children are at increased risk of vaccine-preventable diseases like pertussis, varicella, and mumps. Additionally, communities with a higher proportion of RE are at increased risk of vaccine preventable disease transmission.

*FL SHOTS (State Health Online Tracking System) is Florida's statewide immunization registry. All REs are required to be entered into FL SHOTS.



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Produced by the BOE, Florida Department of Health

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Summary

April 2018

State pertussis activity:

- **Twenty-two confirmed and probable pertussis cases** were reported among 12 counties in April.
 - Pertussis activity increased slightly from the previous month and but remained consistent with trends observed in previous years at this time.
 - From January 1, 2018 through April 30, 2018, 88 confirmed and probable cases of pertussis were reported among 24 of Florida's 67 counties.
- Since 2014, an overall decrease in the annual number of confirmed and probable cases of pertussis reported has been observed. Pertussis is cyclic in nature with peaks in disease every 3-5 years.
- **There were two outbreaks of pertussis reported in April.**
 - Both outbreaks were in school settings and consisted of two cases each.
 - For most pertussis cases, exposure to other known cases is never identified, and they are not able to be linked to outbreaks.
- **In April, for every pertussis case identified, there was an average of three exposed contacts who were recommended antibiotics to prevent illness.** For those diagnosed with pertussis, antibiotics can shorten the amount of time they are contagious to others. Antibiotics can also be used to prevent illness in those who have been exposed to someone with pertussis while they are contagious.
- **Infants less than one year old had the highest incidence of pertussis.** This is consistent with national trends. Infants less than two months old are too young to receive vaccinations against pertussis, which is why vaccination of other age groups is so important to help prevent infection in infants.
- **Vaccination is the best way to prevent pertussis infections.** In April, 55% of reported cases had not received the recommended number of pertussis vaccinations for their age or had unknown vaccination status. In general, those who have received at least one pertussis vaccination have less severe outcomes than those who have never been vaccinated. **In April, those who were never vaccinated were most likely to visit the emergency department and require hospitalization.**
- To learn more about pertussis, please visit <http://www.floridahealth.gov/pertussis>.

National pertussis activity:

- The number of pertussis cases has been gradually increasing since the 1980s, peaking in 2012 at levels not seen since the 1950s. Since 2012, the number of pertussis cases has started to gradually decrease.
- Pertussis incidence has remained highest among infants less than one year old and lowest among those age 20 and older since the 1990s.
- **A new study** found that pertussis vaccination reduces transmission of disease, but that more doses are required for disease elimination. This highlights the importance of keeping school-aged children up-to-date on vaccinations to prevent transmission in the community, especially infants too young to be vaccinated.

Pertussis surveillance goals:

- Pertussis surveillance is conducted to identify cases to limit transmission in settings with infants or others who may transmit pertussis to infants, and identify and prevent outbreaks.
- Surveillance is also conducted to identify contacts of cases and recommend appropriate prevention measures, including exclusion, antibiotic prophylaxis and immunization and to monitor the effectiveness of immunization programs and vaccines. For more information on the data sources used in Florida for pertussis surveillance, see page 11. ▶

Map 2

Map 2 shows the previous three-month average of pertussis incidence rates per 100,000 population, January through March 2018 (green shading). Counties with one or more cases reported in April 2018 are highlighted in pink.

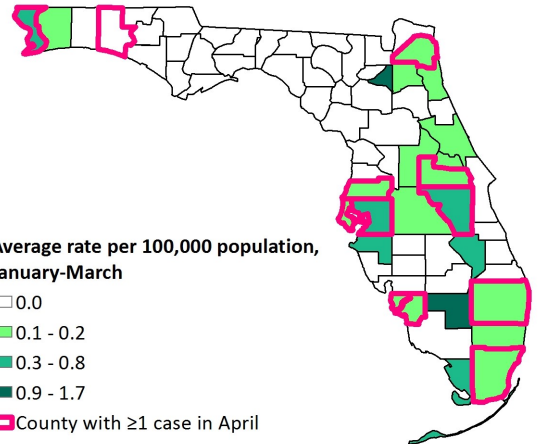
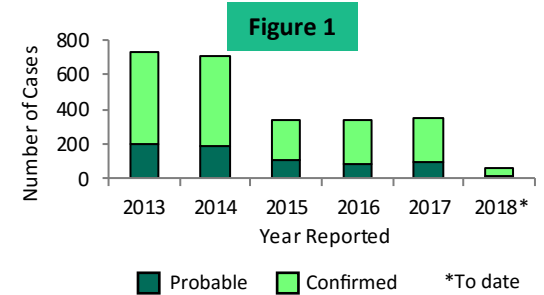


Figure 1 shows the number of confirmed and probable cases of pertussis reported into Merlin, 2013 through April 2018.



Pertussis Cases by Month Reported

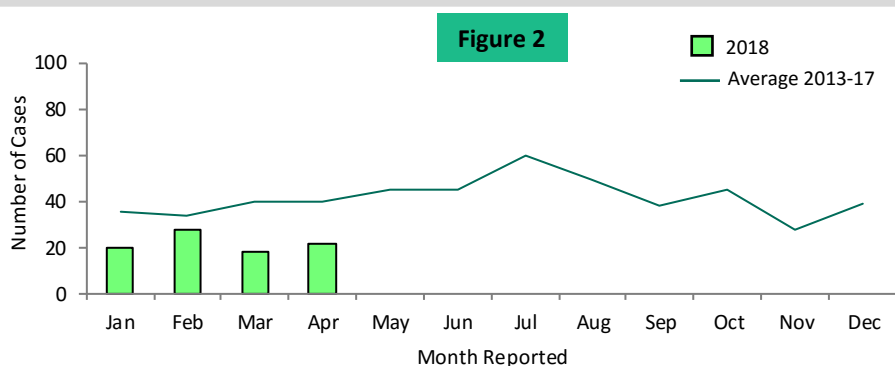


Figure 2 shows the number of confirmed and probable cases of pertussis reported into Merlin, January 2018 through April 2018 and the previous five-year average.

In April, the number of reported pertussis cases increased slightly from March and remained below the five-year average. In general, the number of reported pertussis cases tends to be highest during the summer months.

Pertussis Outbreaks

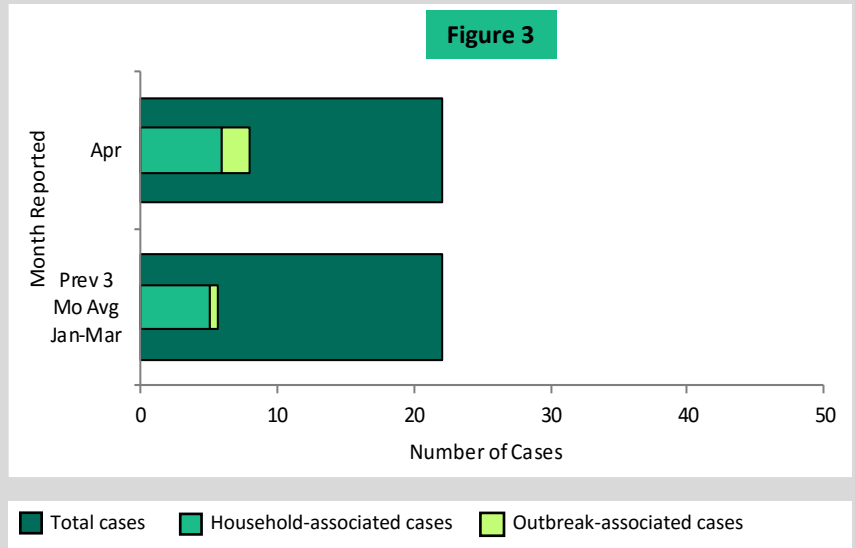
Figure 3 shows the number of confirmed and probable cases that were associated with at least one other case and the total number of confirmed and probable cases as reported into Merlin, April 2018 and the previous three-month average.

In April, six (27%) cases were associated with transmission within households and two (9%) cases were outbreak associated.

Outbreak Summary:

In April, two outbreaks of pertussis were reported. Both outbreaks were in school settings in Escambia and Hillsborough counties. Each outbreak consisted of 2 cases, where the first case was reported in March, and the second case was reported in April.

See [page 11](#) for outbreak definitions.



Pertussis Treatment and Contacts

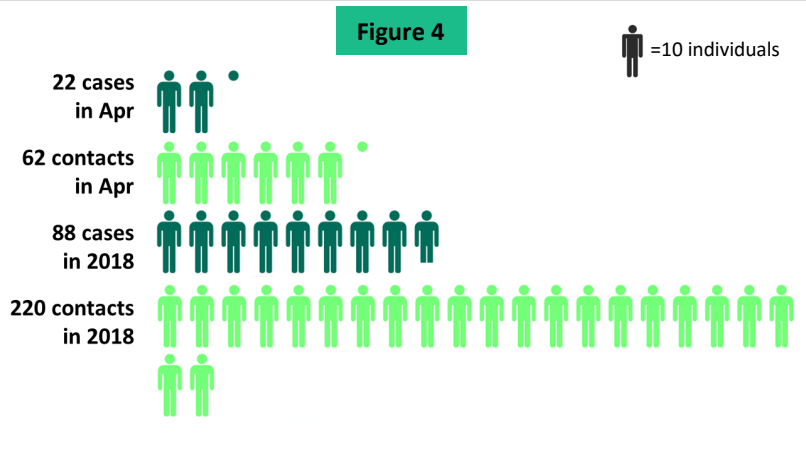
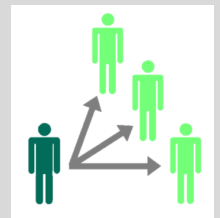


Figure 4 shows the number of confirmed and probable cases of pertussis, as reported into Merlin, and the number of contacts who were recommended antibiotics to prevent illness, April 2018 and 2018 to date.

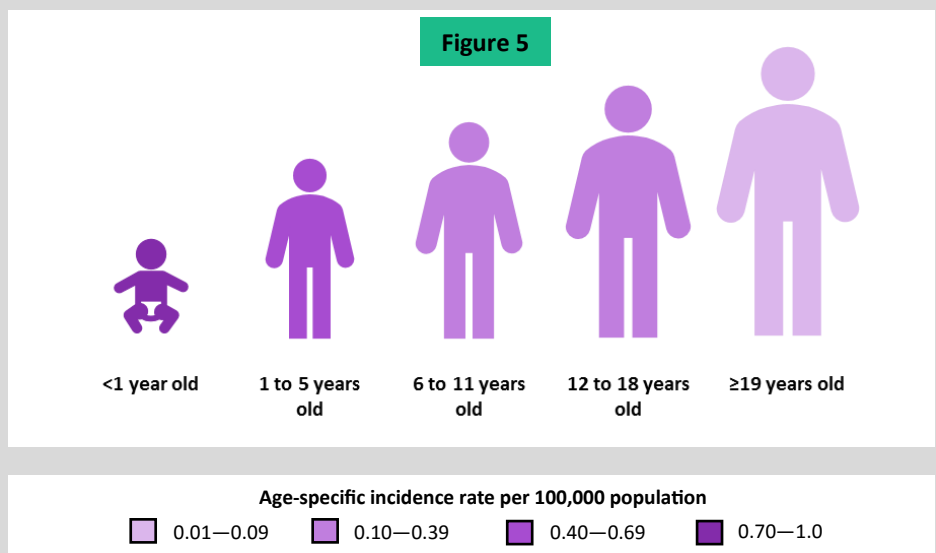
On average, for each case reported in March there were three people exposed to the case who were recommended antibiotics to prevent illness.



Pertussis Age-Specific Incidence Rates

Figure 5 shows the age-specific incidence rates of confirmed and probable cases of pertussis, as reported into Merlin, April 2018.

In April, the incidence rate was highest among infants less than one year old at 0.8 cases per 100,000 population, which is consistent with previous months. Infants experience the greatest burden of pertussis infections, not only in number of cases but also in severity. Infants less than two months old are too young to receive vaccinations against pertussis, which is why vaccination of grandparents, parents, siblings, and other age groups is so important to help prevent infection in infants.



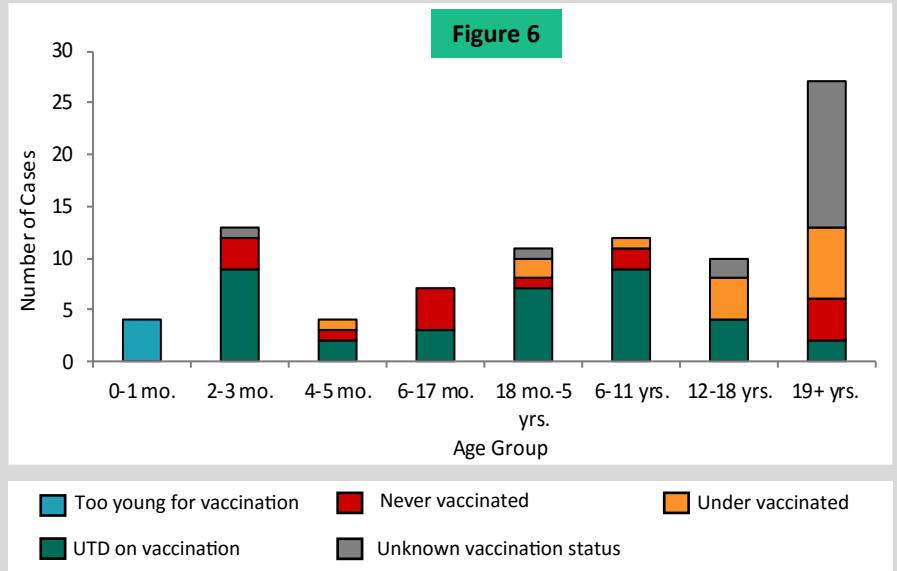
Vaccination History for Pertussis Cases

UTD = up-to-date

Figure 6 shows the vaccination status of pertussis cases by age group for confirmed and probable cases of pertussis, as reported into Merlin, January through April 2018 (n=88).

Half or more of individuals in the 4-5 months and 6-17 months age groups were not up-to-date on their pertussis vaccinations. In general, those who have received at least one pertussis vaccination have less severe outcomes than those who have never been vaccinated.

See [page 11](#) for links to the CDC recommended vaccination schedules.

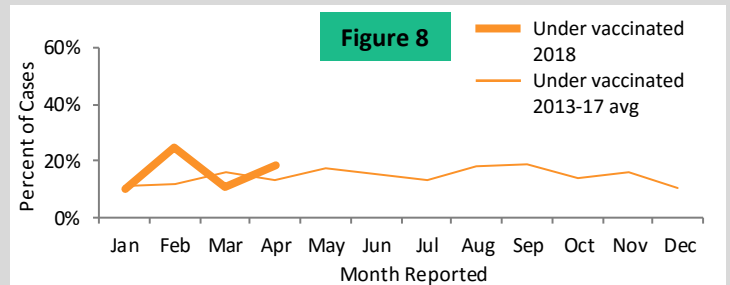
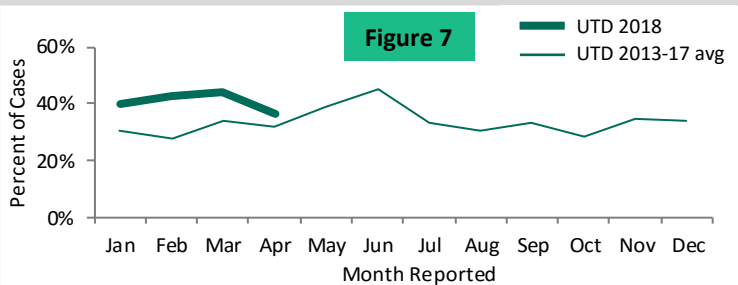


Pertussis Cases in Vaccinated Individuals

UTD = up-to-date

Figure 7 shows the percent of confirmed and probable pertussis cases who were up-to-date on their pertussis vaccinations, as reported into Merlin, January through April 2018 and the previous five-year average. **Figure 8** shows the percent of these cases who were under vaccinated during the same time periods.

Although individuals who have been vaccinated can still get pertussis, complete and timely vaccination remains the best way to prevent pertussis and severe complications.



Pertussis Outcomes

UTD = up-to-date, ED = emergency department

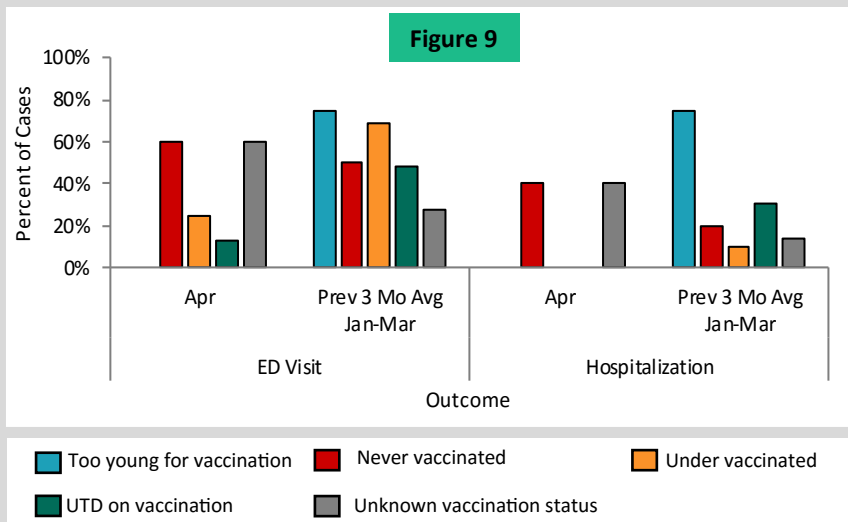


Figure 9 shows the percent of confirmed and probable cases of pertussis with select outcomes by vaccination status, as reported into Merlin, April 2018 and the previous three-month average.

In April, cases who were never vaccinated or who had unknown vaccination status were more likely to visit the emergency department and require inpatient hospitalization.

In general, older individuals are more likely to experience paroxysmal cough while younger individuals are more likely to experience posttussive vomiting and whoop. Primarily infants less than one year old experience apnea.

Summary

April 2018

State varicella activity:

- **Seventy-one confirmed and probable varicella cases were reported among 22 counties in April.**
 - The number of reported varicella cases was similar to March and was slightly above the April five-year average.
 - From January 1, 2018 through April 30, 2018, 232 cases of varicella were reported among 44 of Florida's 67 counties.
- A decreasing trend in the number of confirmed and probable cases of varicella reported annually in Florida was observed from 2008-2014. Although the number of cases was higher than the previous five years, overall fewer cases have been reported in 2018 than at this time in 2017. Increased varicella activity is expected for the spring months.
- **In April, no new outbreaks were reported.** An outbreak of varicella was reported in a school in March; 19 cases were identified and the outbreak is now closed.
- **In April, children aged less than one year old had the highest incidence of varicella.** This is consistent with what has been observed thus far in 2018.
- **Vaccination is the best way to prevent varicella infection.** In April, 64% of cases were not up to date on their varicella vaccinations or had unknown vaccination status. In general, those who receive at least one dose of varicella vaccination, even if they later develop disease, have less severe outcomes than those who have never been vaccinated. In April, cases who were up to date on their vaccinations or had unknown vaccination status were most likely to visit the emergency department.
- To learn more about varicella, please visit <http://www.floridahealth.gov/varicella>.

National varicella activity:

- Varicella incidence decreased significantly following the vaccine becoming available in 1995 and has continued to decrease since 2006 when recommendations changed from one to two doses of varicella vaccine.
 - From 2006 –2015 all age groups saw a significant decrease in incidence with the largest decline in children age 5-9 years and age 10-14 years.
- Although varicella is not reportable in all states and therefore not all states report varicella cases to the Centers for Disease Control (CDC), based on available data the number of varicella cases nationally has steadily decreased each year from 2012-2015.

Map 3

Map 3 shows the previous three-month average of varicella incidence rates per 100,000 population, January through March 2018 (green shading). Counties with one or more cases reported in April 2018 are highlighted in pink.

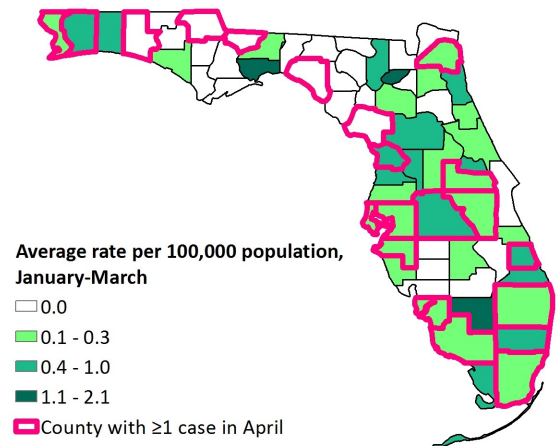
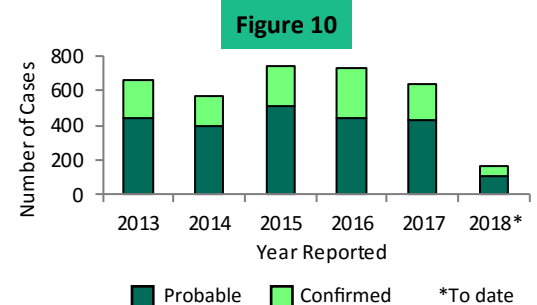


Figure 10 shows the number of confirmed and probable cases of varicella reported into Merlin, 2013 through April 2018.



Surveillance goals:

- Varicella surveillance is conducted to identify and control outbreaks and monitor trends and severe outcomes.
- Surveillance is also conducted to monitor effectiveness of immunization programs and vaccines. For more information on the data sources used in Florida for varicella surveillance, see page 11 ►

Varicella Cases by Month Reported

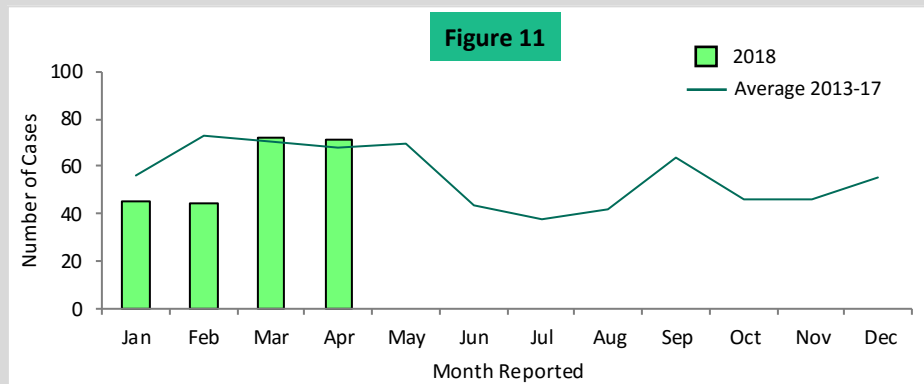


Figure 11 shows the number of confirmed and probable cases of varicella reported into Merlin, January through April 2018 and the previous five-year average.

In April, the number of reported varicella cases was similar to that reported in March and was slightly above the previous five-year average. In general, varicella activity is highest during the late winter and spring.

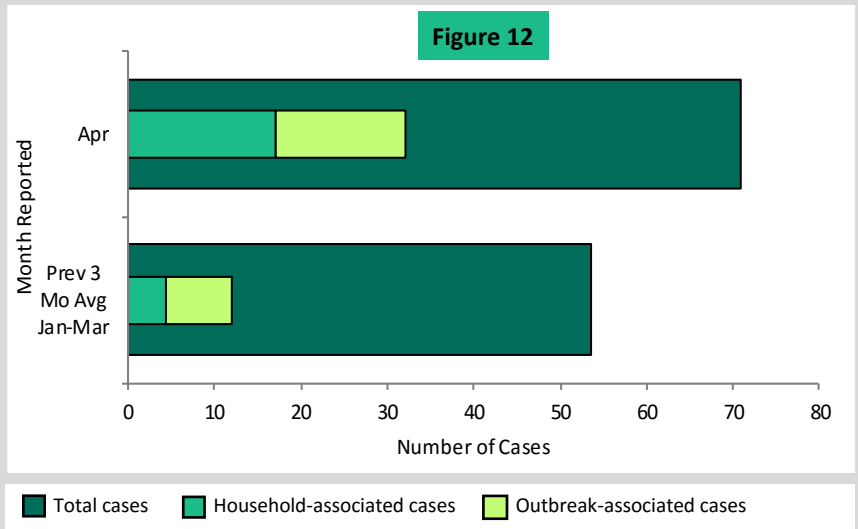
Varicella Outbreaks

Figure 12 shows the number of confirmed and probable cases that were associated with at least one other case and the total number of confirmed and probable cases as reported into Merlin, April 2018 and the previous three-month average. Cases associated with at least one other case are shown by type of association.

In April, 17 (24%) cases were associated with transmission within households and 15 (21%) cases were associated with a school outbreak first reported in March.

Outbreak Summary:

No new outbreaks were reported in April 2018. In March, an outbreak of varicella was reported in a Palm Beach County school. A total of 19 cases were identified and the outbreak is now closed. So far in 2018, three varicella outbreaks have been reported.



Varicella Age-Specific Incidence Rates

Figure 13

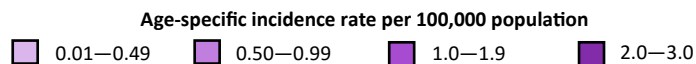
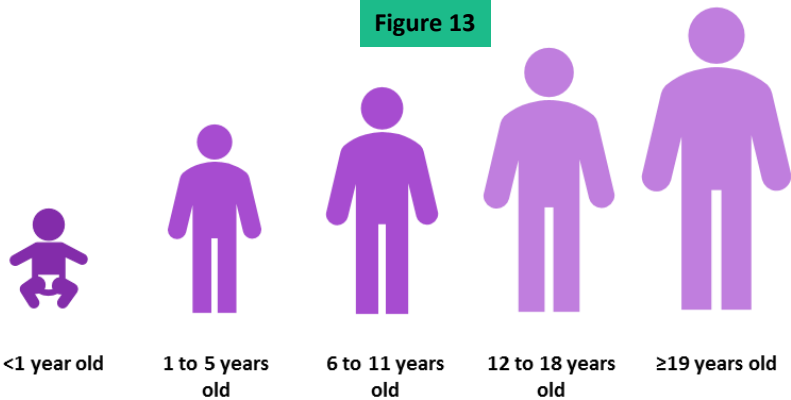


Figure 13 shows the age-specific incidence rates of confirmed and probable cases of varicella, as reported into Merlin, April 2018.

In April, the varicella incidence rate was highest among infants less than one year old at 2.7 cases per 100,000 population. This is consistent with trends seen earlier in 2018. Infants less than one year old are too young to receive varicella vaccination, which is why vaccination of grandparents, parents, siblings, and other age groups is so important to help prevent infection in infants.

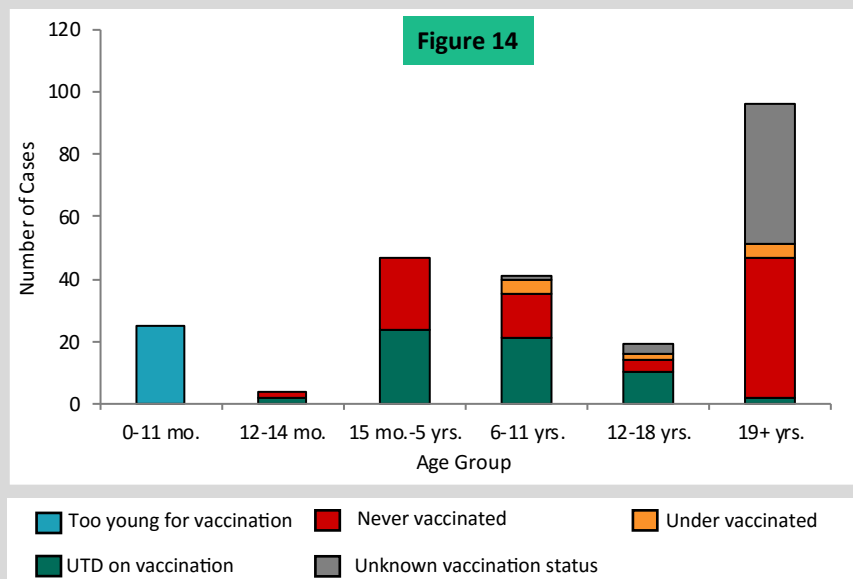
Vaccination History for Varicella Cases

UTD = up-to-date

Figure 14 shows the vaccination status of varicella cases by age group for confirmed and probable cases of varicella, as reported into Merlin, January through April 2018 (n=232).

Varicella vaccinations are recommended at 12-15 months of age and 4-6 years of age. Of the 96 cases in adults aged 19 and older, 45 (47%) were not up-to-date on their varicella vaccinations.

See [page 11](#) for links to CDC recommended vaccination schedules.



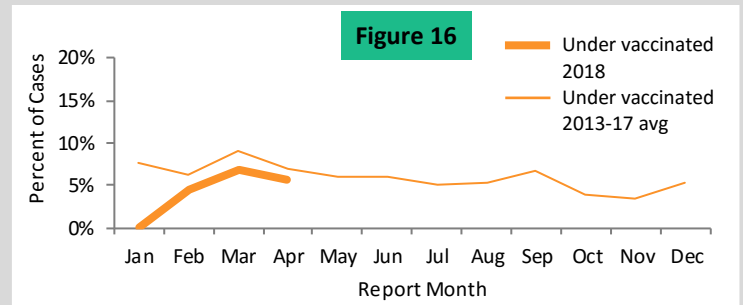
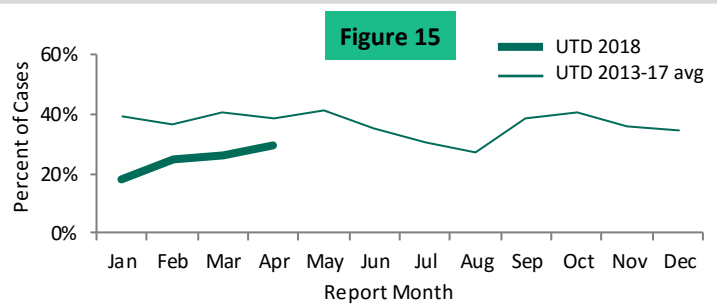
Varicella Cases in Vaccinated Individuals

UTD = up-to-date

Figure 15 shows the percent of confirmed and probable varicella cases who were up to date on their varicella vaccinations, as reported into Merlin, January through April 2018 and the previous five-year average.

Figure 16 shows the percent of these cases who were under vaccinated during the same time periods.

Although individuals who have been vaccinated can still get varicella, complete and timely vaccination remains the best way to prevent varicella and severe complications.



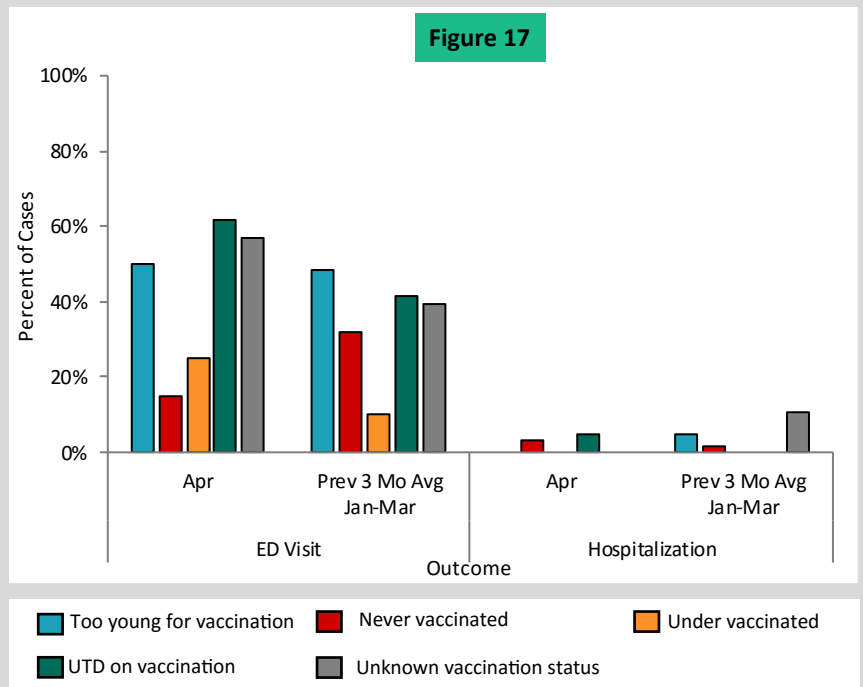
Varicella Outcomes

UTD = up-to-date, ED = emergency department

Figure 17 shows the percent of confirmed and probable cases of varicella with select outcomes by vaccination status, as reported into Merlin, April 2018 and the previous three-month average.

In general, cases who were UTD on their vaccinations were less likely to experience fever and vesicle lesions. Cases too young to be vaccinated or not yet vaccinated were more likely to experience papule lesions.

In April, individuals with unknown vaccination status or who were UTD on vaccination were most likely to visit the emergency department. Few varicella cases require inpatient hospitalization. In general, those who received at least one dose of varicella vaccination, even if they later develop disease, have less severe outcomes than those who have never been vaccinated.



Summary

April 2018

State mumps activity:

- **Two confirmed and one probable mumps cases were reported among two counties in April.**
 - Mumps cases were elevated from April 2017 through March 2018 with a peak of 20 cases reported in August 2017; trends for 2018 will continue to be monitored closely.
 - From January 1, 2018 through April 30, 2018, 12 confirmed and 11 probable cases of mumps were reported among seven of Florida's 67 counties.
- In Florida, the number of reported mumps cases has remained relatively low over the past five years but has steadily increased since 2015 (10 cases), with a large spike in 2017 (70 cases). The last time the number of reported cases reached 2017 levels was in the 1990s.
- **No outbreaks of mumps were reported in April.**
 - In 2017, the majority of mumps cases were associated with outbreaks or household clusters.
 - While mumps outbreaks can occur in highly-vaccinated communities, high vaccination coverage limits the size, duration, and spread of outbreaks.
- **In April, the highest incidence of mumps was in children age 6-11 years old.**
- **Vaccination is the best way to prevent mumps infections.** In April, 66% of cases were not up-to-date on their mumps vaccinations or had an unknown vaccination status.
- In recent months, individuals not up to date on mumps vaccinations were more likely to visit the emergency department and require inpatient hospitalization. In general, those who have received at least one mumps vaccination even if they later develop disease suffer less severe outcomes than those who have never been vaccinated.
- To learn more about mumps, please visit <http://www.floridahealth.gov/mumps>.

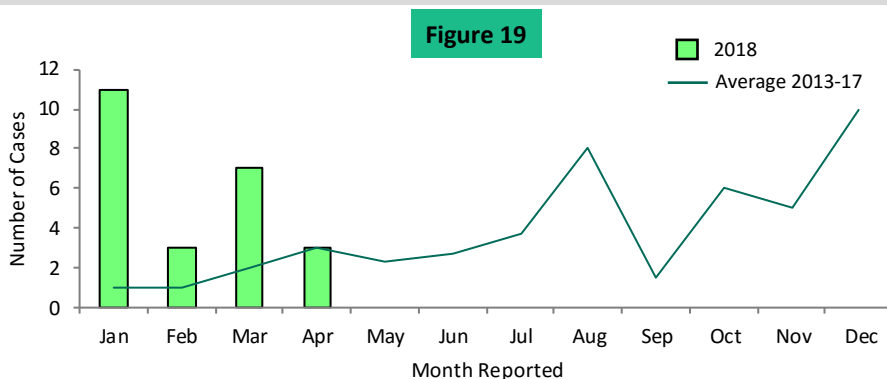
National mumps activity:

- Since 1989 when the two dose vaccination program was introduced, the number of mumps cases has fluctuated from a few hundred to a few thousand per year. Some years had higher numbers of cases than others mainly because of several large outbreaks in close-contact settings.
- In 2016, there were over 6,000 cases of mumps reported, and in 2017 there were over 5,600 cases reported. Since 2013, the 18-22 year age group has had the highest incidence of mumps, largely driven by outbreaks. About half of the outbreaks reported since 2016 have been associated with colleges and universities, primarily affecting young adults.
- The Advisory Committee on Immunization Practices recently recommended a third mumps virus-containing vaccine for certain populations identified by public health authorities as being at increased risk of mumps because of an outbreak. To learn more please visit <https://www.cdc.gov/mmwr/volumes/67/wr/mm6701a7.htm>.

Surveillance goals:

- Mumps surveillance is conducted to identify and control outbreaks and monitor trends and severe outcomes.
- Surveillance is also conducted to monitor effectiveness of immunization programs and vaccines. For more information on the data sources used in Florida for mumps surveillance, see page 11 ►

Mumps Cases by Month Reported



Map 4

Map 4 shows the cumulative mumps incidence rates per 100,000 population, January through April 2018 (green shading). Counties with one or more cases reported in April 2018 are highlighted in pink.

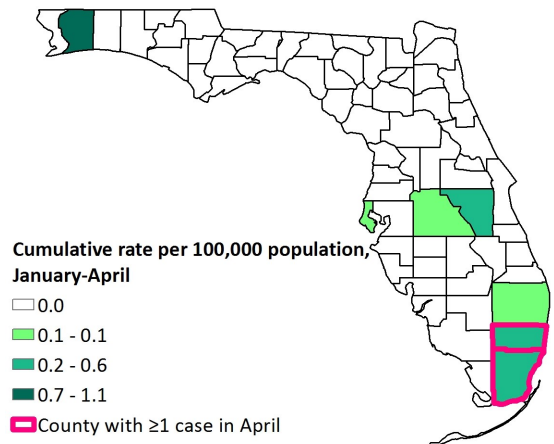


Figure 18 shows the number of confirmed and probable cases of mumps reported into Merlin, 2013 through April 2018.

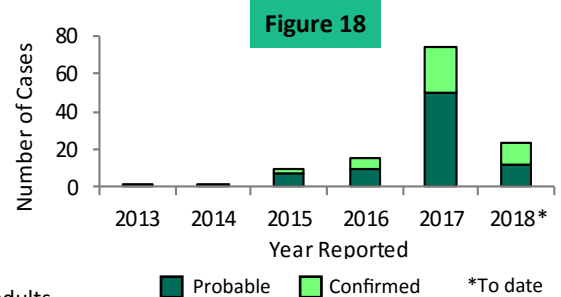


Figure 19 shows the number of confirmed and probable cases of mumps reported into Merlin, January through April 2018 and the previous five-year average.

In April, the number of reported mumps cases decreased from that in March, and was consistent with the previous five-year average. Cases were elevated from April 2017-March 2018, but returned to normal levels in April 2018. This trend will be closely monitored.

Mumps Outbreaks

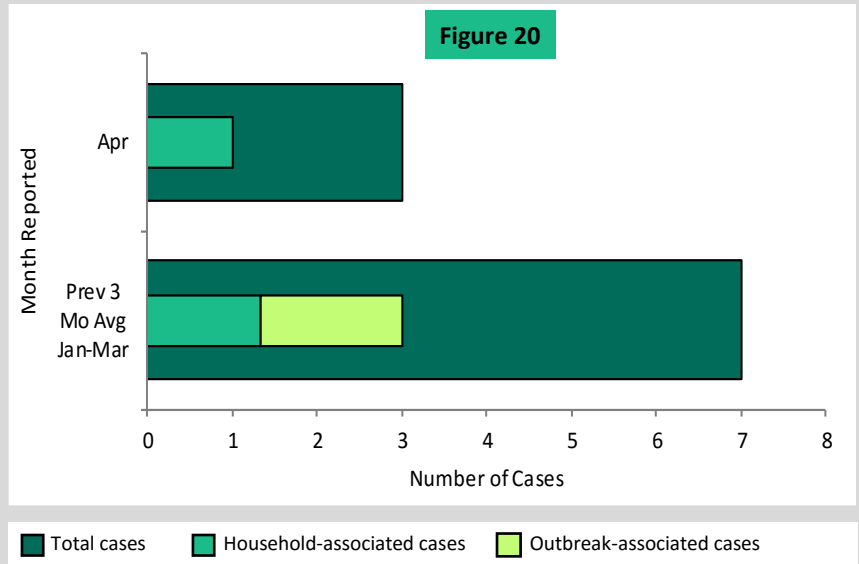
Figure 20 shows the number of confirmed and probable cases that were associated with at least one other case and the total number of confirmed and probable cases as reported into Merlin, April 2018 and the previous three-month average. Cases associated with at least one other case are shown by type of association.

In April, one (33%) case was associated with transmission within a household.

Outbreak Summary:

As of April, no outbreaks of mumps have been reported in 2018. All outbreak-associated cases reported in 2018 were identified during outbreak investigations that began in December 2017 and closed in January 2018.

See [page 11](#) for outbreak definitions.



Mumps Age-Specific Incidence Rates

Figure 21

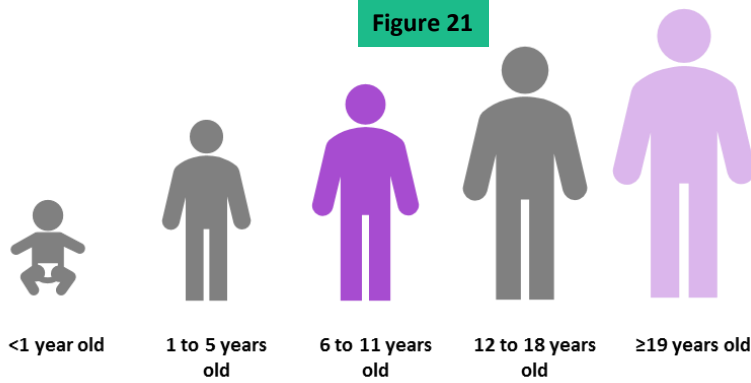
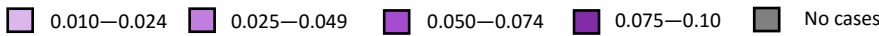


Figure 21 shows the age-specific incidence rates of confirmed and probable cases of mumps, as reported into Merlin, April 2018.

In April, the mumps incidence rate was highest among children age 6-11 years old at 0.07 cases per 100,000 population. There were no cases of mumps reported for three of the age groups in April 2018. Although the incidence rate was low among adults age 19 and older, 58% of cases reported so far in 2018 were in this age group.

Age-specific incidence rate per 100,000 population

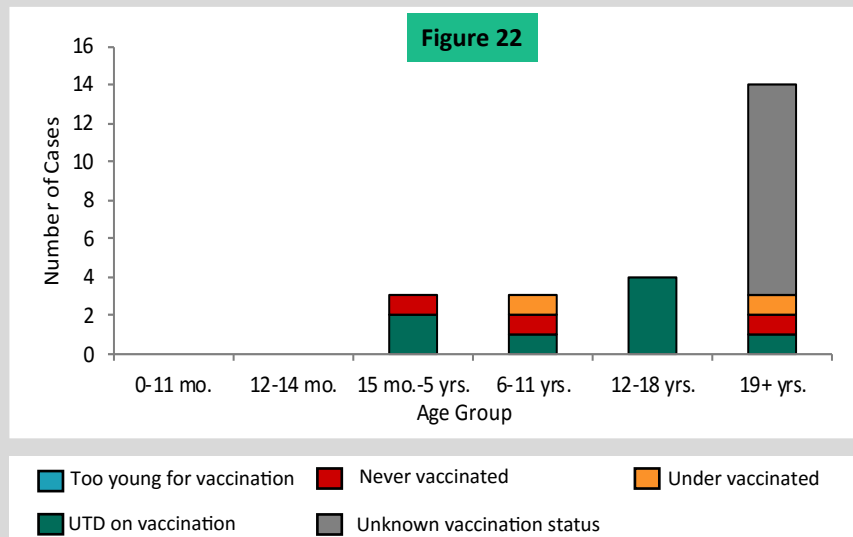


Vaccination History for Mumps Cases

UTD = up-to-date

Figure 22 shows the vaccination status of mumps cases by age group for confirmed and probable cases of mumps, as reported into Merlin, January through April 2018 (n=24).

Mumps vaccinations are recommended at 12-15 months of age and again at 4-6 years of age. Eleven (79%) individuals aged 19 years and older had unknown mumps vaccinations, and two (66%) individuals aged 6-11 years were not UTD on vaccination. The majority of individuals aged 15 months-18 years old were UTD on their vaccinations.



See [page 11](#) for links to CDC recommended vaccination schedules.

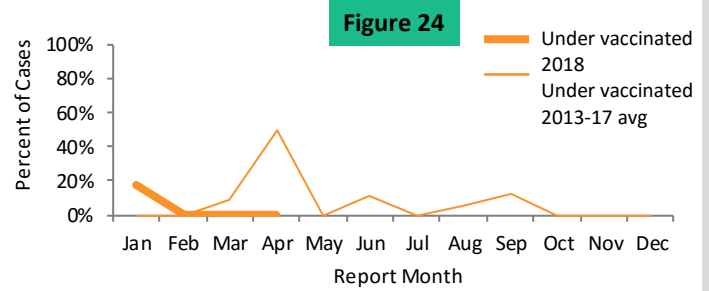
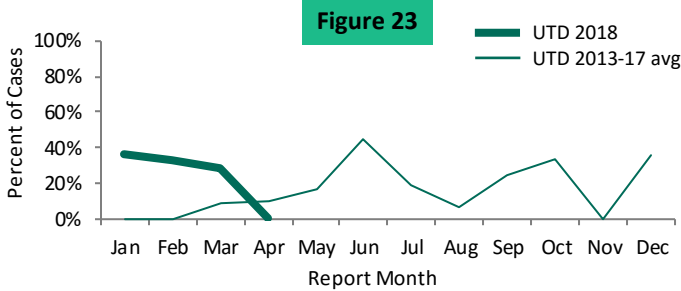
Mumps Cases in Vaccinated Individuals

UTD = up-to-date

Figure 23 shows the percent of confirmed and probable mumps cases who were up to date on their mumps vaccinations, as reported into Merlin, January through April 2018 and the previous five-year average.

Figure 24 shows the percent of these cases who were under vaccinated during the same time periods. All cases in April 2018 were unvaccinated or had unknown vaccination status.

Although individuals who have been vaccinated can still contract mumps, complete and timely vaccination remains the best way to prevent mumps and severe complications.



Mumps Outcomes

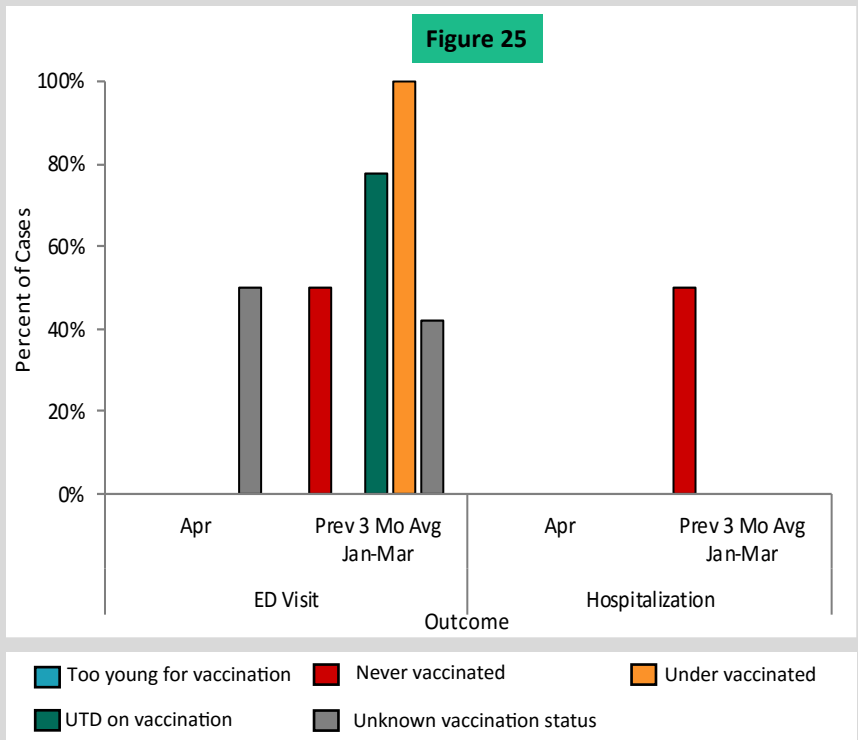
UTD = up-to-date, ED = emergency department

Figure 25 shows the percent of confirmed and probable cases of mumps with select outcomes by vaccination status, as reported into Merlin, April 2018 and the previous three-month average.

In recent months, individuals not up to date on their vaccinations were most likely to visit the emergency department and require inpatient hospitalization.

Orchitis (testicular inflammation) is the most common complication from mumps in males. From January through April 2018, three (13%) cases reported orchitis; one was never vaccinated and two had an unknown vaccination status.

In general, those who received at least one dose of mumps vaccination, even if they later develop disease, have less severe outcomes than those who have never been vaccinated.



Case Data

- Current case information is preliminary and will change as new data are gathered. The most recent data available are displayed in this report.
- Pertussis, varicella, and mumps are reportable diseases in Florida. Case information is documented by county health department (CHD) epidemiologists in Merlin, Florida's reportable disease surveillance system.
- CHD epidemiologists also report outbreaks of pertussis, varicella, and mumps into Merlin.
 - Household-associated cases are defined as two or more cases exposed within the same household.
 - Pertussis and mumps outbreaks are defined as two or more cases associated with a specific setting outside of a household.
 - Varicella outbreaks are defined as five or more cases associated with a specific setting outside of a household.
- For more information about reportable diseases, please visit www.Floridahealth.gov/diseasereporting.
- For more information about Florida's guides to surveillance and investigation, including disease specific probable and confirmed case definitions, please visit www.Floridahealth.gov/gsi.

Population Data

- Population data used to calculate incidence rates are from FLHealthCHARTS (Community Health Assessment Resource Tool Set).
- For more information about FLHealthCHARTS, please visit www.flhealthcharts.com.

Vaccination Data

- Vaccination data from cases are from Merlin, as identified by CHD epidemiologists.
- Vaccination status is determined using the Advisory Committee on Immunization Practices Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger, 2018.
- Cases are considered up-to-date if they have received the recommended number of doses of vaccine for a particular disease for their age at the time of their illness onset. Cases are considered under vaccinated if they have received at least one but not all doses of vaccine recommended for a particular disease for their age at the time of their illness onset.
- For more information about immunization schedules, please visit <https://www.cdc.gov/vaccines/schedules/index.html>.
- For a full text version of a new study on pertussis vaccination, please visit <http://www.cidid.org/publications-1/2018/3/29/the-impact-of-past-vaccination-coverage-and-immunity-on-pertussis-resurgence>