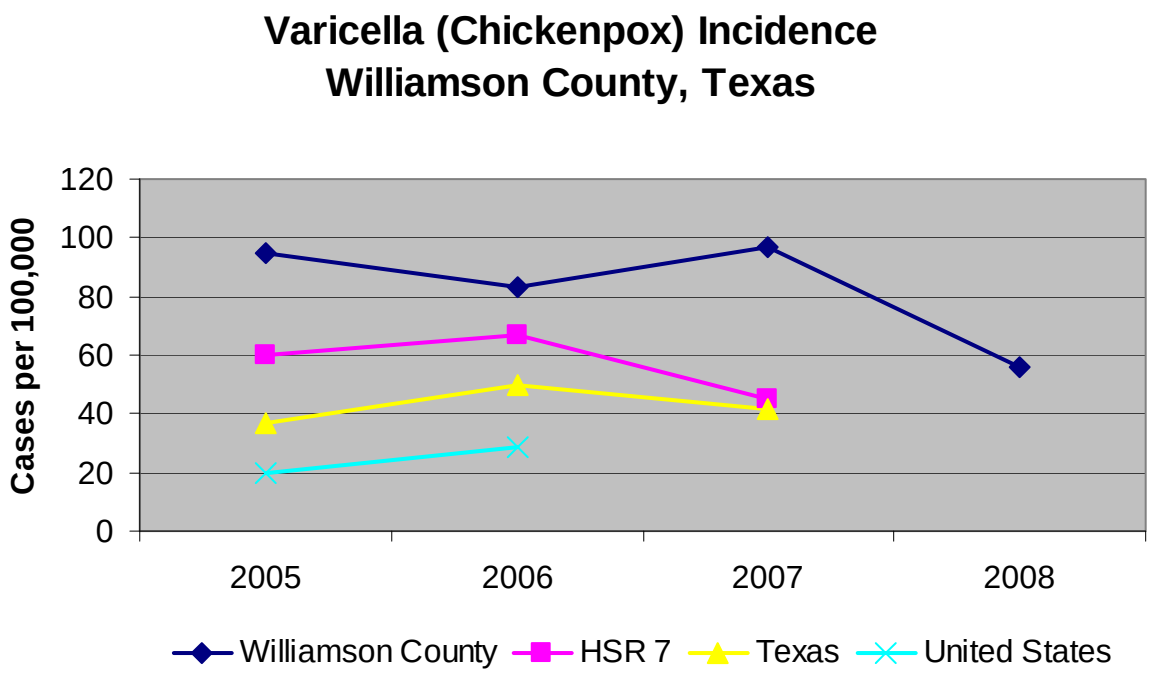
# Varicella (Chickenpox) Trends & Statistics
# Williamson County, Texas

Chickenpox is a disease caused by infection with the varicella zoster virus (VZV), which causes fever and an itchy rash. Symptoms are a skin rash of blister-like lesions, covering the body but usually more concentrated on the face, scalp, and trunk. Most, but not all, infected individuals have fever, which develops just before or when the rash appears. If exposed, persons who have been vaccinated against the disease may get a milder illness, with less severe rash (sometimes involving only a few red bumps that look similar to insect bites) and mild or no fever. Potential serious complications include bacterial infection of the skin, swelling of the brain, and pneumonia. Adolescents and adults are more at risk for severe disease. The virus is spread by coughing and sneezing (highly contagious), by direct contact, and by aerosolization of virus from skin lesions. Varicella vaccine can prevent chickenpox. Currently, two doses of vaccine are recommended for children, adolescents, and adults.

## Chickenpox Incidence

Incidence is the number of new cases of a disease that arise during a specific period of time.



## Chickenpox Surveillance Data

WCCHD nurses, public health technicians, and epidemiologists work together to conduct public health surveillance. Public health surveillance for chickenpox has clear objectives and provides and interprets data to facilitate the prevention and control of disease by:

- Identifying cases and outbreaks and responding appropriately;
- Confirming the agent causing illness and conducting further laboratory studies if necessary to ensure control measures and treatment recommendations are optimal;
- Raising awareness of disease in the medical community and the general public.

To achieve these objectives, disease reporting systems must be timely, provide an accurate picture in time of the disease, be sensitive enough to identify persons with disease, and be specific enough to exclude persons not having disease. The ultimate goal is to reduce the morbidity, mortality, and economic burdens associated with chickenpox.

### *Case Definitions and Laboratory Confirmation*

Chickenpox is an illness with acute onset of diffuse (generalized) maculo-papulovesicular rash without other apparent cause. Laboratory criteria for diagnosis include:

- Isolation of varicella virus from a clinical specimen, or
- Direct fluorescent antibody (DFA), or
- Polymerase chain reaction (PCR), or
- Significant rise in serum varicella immunoglobulin G (IgG) antibody level by any standard serologic assay

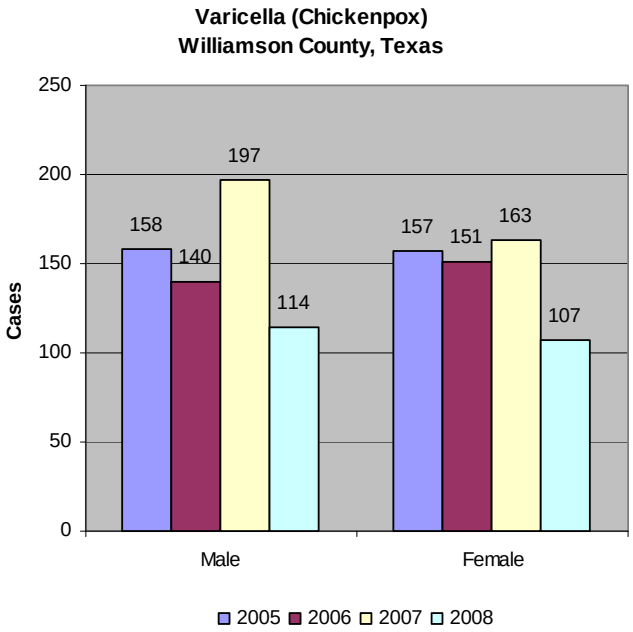
Cases are classified as “probable” or “confirmed” based on the following criteria:

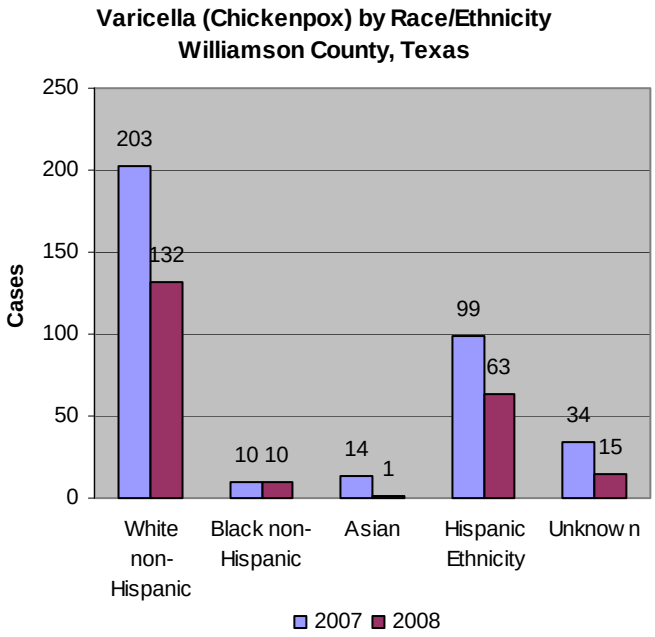
**Probable** - a case that meets the clinical case definition, is not laboratory confirmed, and is not epidemiologically linked to another probable or confirmed case.

**Confirmed** - a case that is laboratory confirmed or that meets the clinical case definition and is epidemiologically linked to a confirmed or probable case.

In vaccinated persons who develop varicella more than 42 days after vaccination (breakthrough disease), the disease is almost always mild with fewer than 50 skin lesions and shorter duration of illness. The rash may also be atypical in appearance (maculopapular with few or no vesicles).

Laboratory confirmation of cases of varicella is not routinely recommended; laboratory confirmation is recommended for fatal cases and in other special circumstances.




**Varicella Incidence by Age, Williamson County, Texas**

| Age Group (years) | Cases per 100,000 by Year | | |
|---|---|---|---|
| | 2005 | 2006 | 2007 |
| <1 | 197 | 210 | 203 |
| 1 – 4 | 154 | 264 | 226 |
| 5 – 14 | 481 | 378 | 481 |
| 15 – 24 | <5 cases | <5 cases | <5 cases |
| >24 | 3 | 2 | 2 |

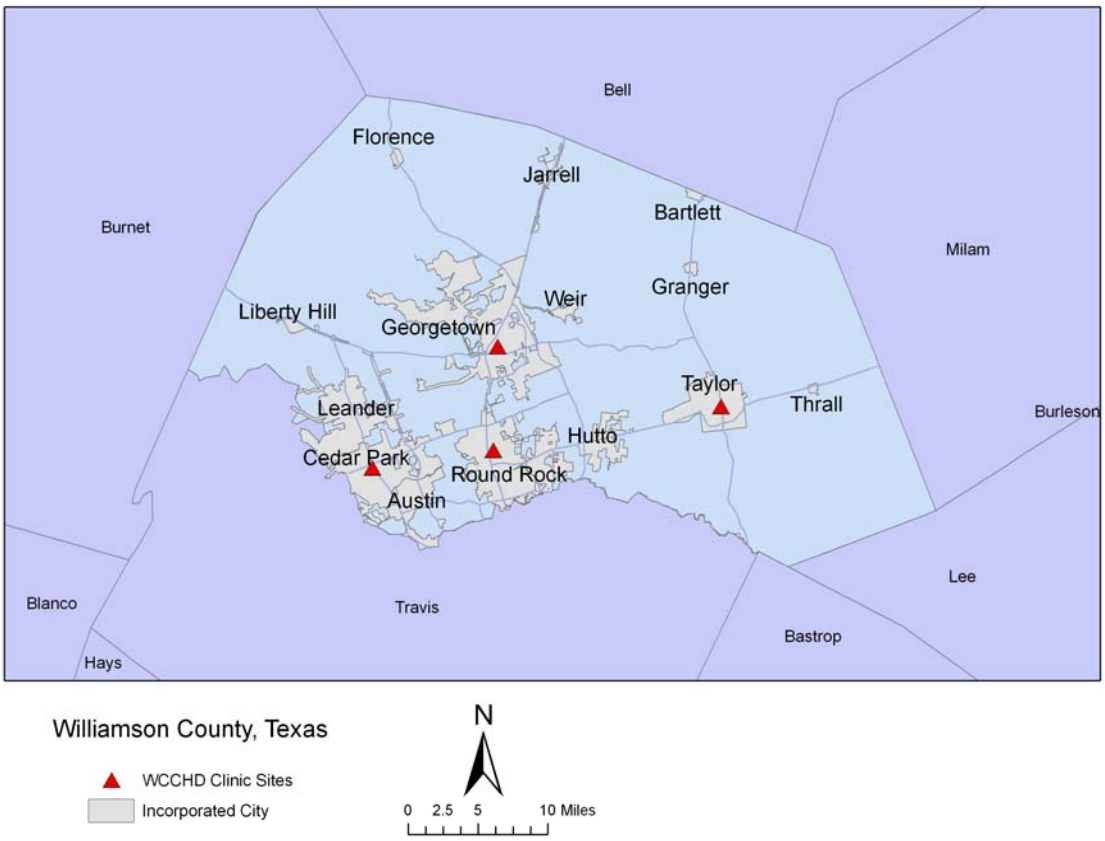
**Varicella Cases Reported by Age, Williamson County, Texas**

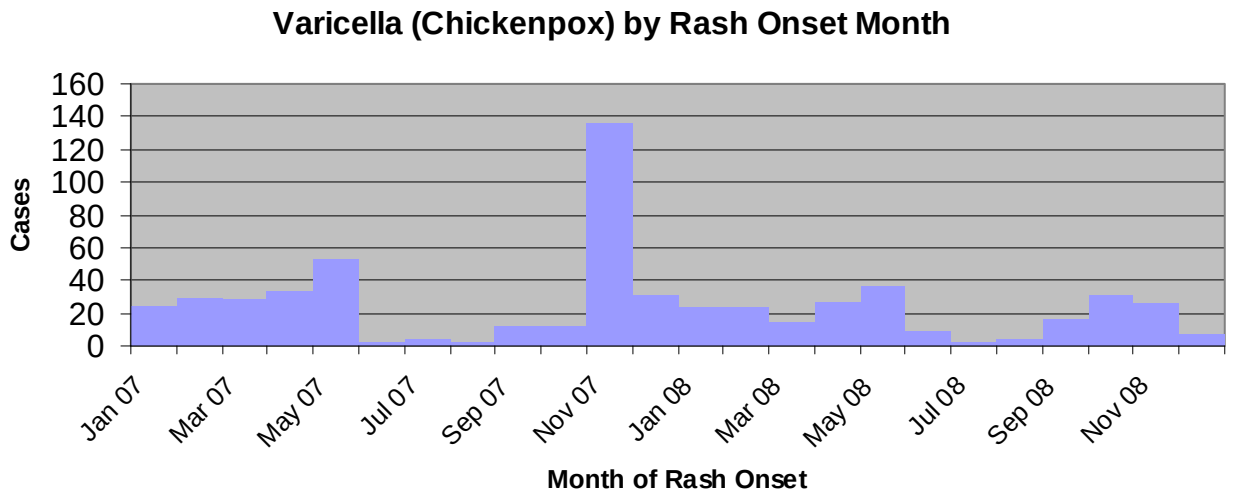
| Age Group (years) | Cases by Year | | | |
|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 |
| <1 | 10 | 11 | 11 | 6 |
| 1 – 4 | 30 | 53 | 47 | 37 |
| 5 – 14 | 266 | 219 | 291 | 166 |
| 15 – 24 | 1 | 2 | 4 | 4 |
| >24 | 7 | 5 | 6 | 7 |
| Unknown | 1 | 1 | 1 | 1 |

**Varicella Cases Reported by Area, Williamson County, Texas**

| Area | Cases by Year | | | |
|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 |
| Round Rock | 149 | 96 | 147 | 96 |
| Cedar Park | 33 | 50 | 13 | 25 |
| Georgetown | 13 | 43 | 16 | 19 |
| Taylor | 43 | 16 | 62 | 15 |
| Austin | 32 | 17 | 87 | 20 |
| Leander | 14 | 36 | 6 | 16 |
| Florence | 0 | 5 | 1 | 1 |
| Liberty Hill | 3 | 8 | 15 | 15 |
| Hutto | 16 | 16 | 9 | 10 |
| Jarrell | 0 | 1 | 1 | 1 |
| Granger | 5 | 1 | 1 | 1 |
| Thrall | 5 | 2 | 1 | 1 |
| Bartlett | 0 | 0 | 1 | 1 |
| All Others | 2 | 0 | 0 | 1 |
| **TOTAL** | **315** | **291** | **360** | **221** |

The Williamson County and Cities Health District (WCCHD) requests official outbreak names from the Texas Department of State Health Services for large Chickenpox outbreaks (outbreaks associated with schools and other institutions). The number of named outbreaks for 2005, 2006, 2007, and 2008 was 2, 6, 3, and 1 respectively.






## Response and Prevention

### *Vaccination*

The Williamson County Retrospective Immunization School Survey is a school-based study that measures vaccination coverage levels of kindergarteners retrospectively at 2 years of age.

**Retrospective Immunization School Survey Results for Varicella Vaccine**

| Vaccine | % Vaccinated by 24 months of Age | |
|---|---|---|
| | 2006 Survey Results | 2007 Survey Results |
| 1 dose of varicella vaccine | 83.9% | 87.7% |

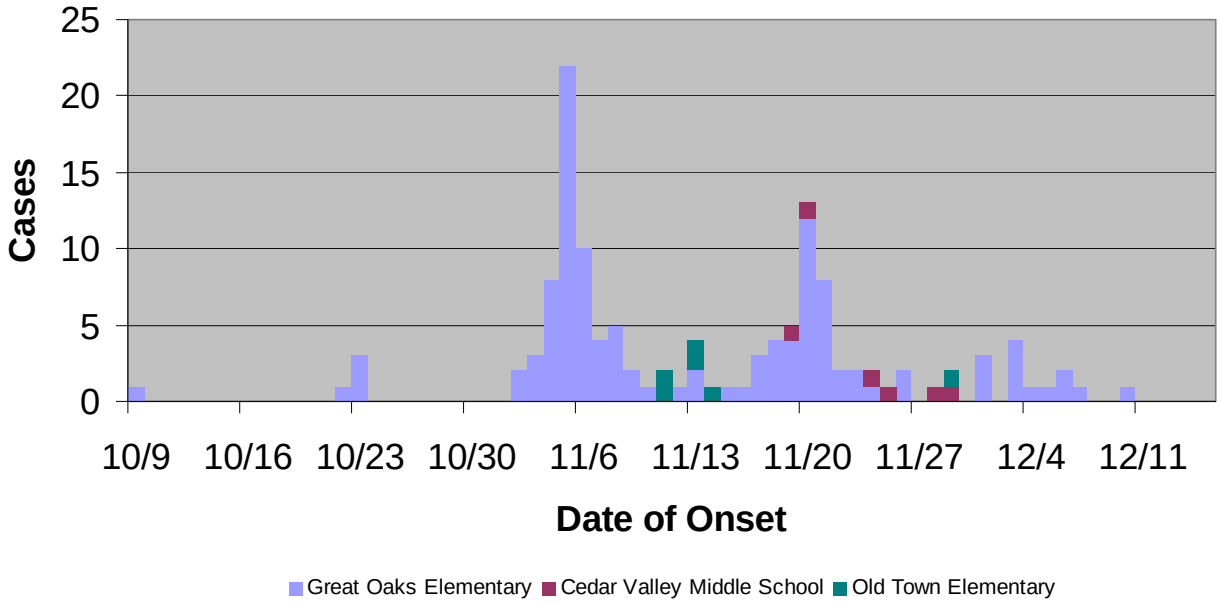
### *Outbreaks Investigated*

*2007 Round Rock Outbreak*

A total of 131 varicella cases associated with a chickenpox outbreak at Great Oaks Elementary School in Round Rock were reported to WCCHD in 2007. Included in the total number of outbreak cases are 13 cases reported from Cedar Valley Middle school and Old Town Elementary (see Epi Curve – by School). All of the schools involved in the outbreak are part of the Round Rock Independent School District.

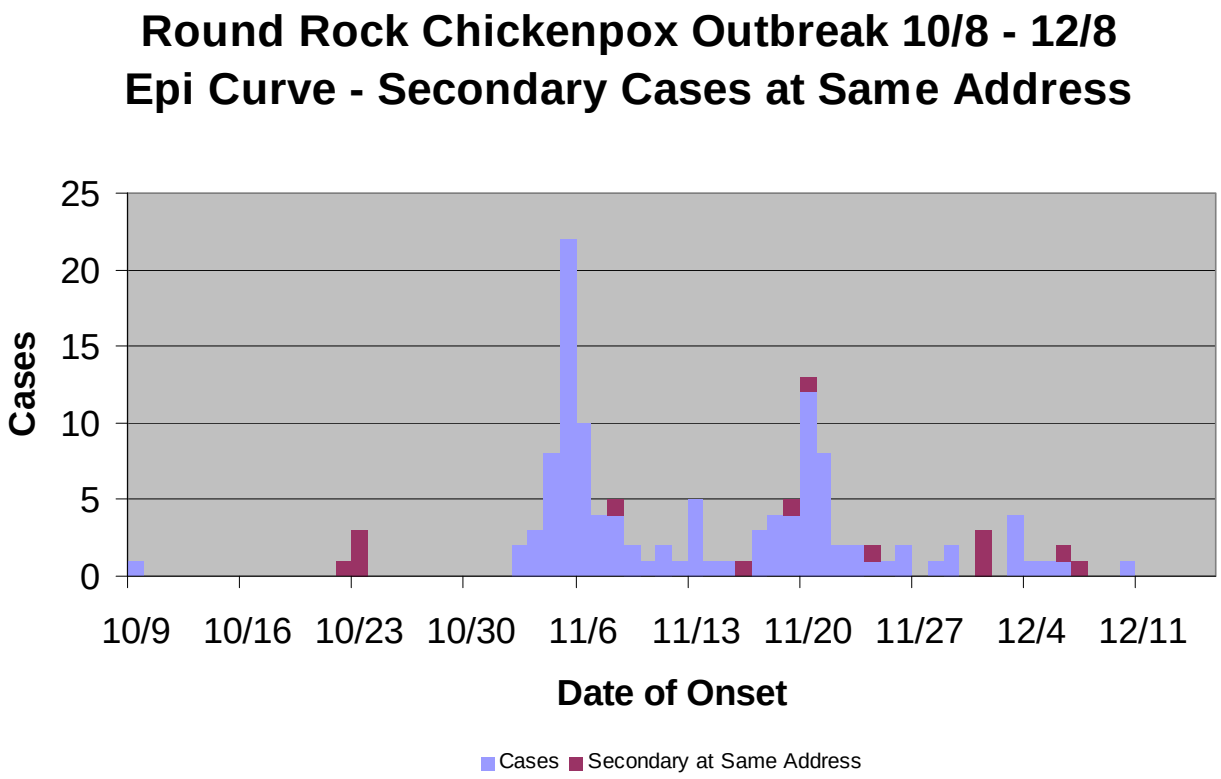
| School Name | # chickenpox cases reported |
|---|---|
| Great Oaks Elementary (RR ISD) | 117 |
| Old Town Elementary (RR ISD) | 7 |
| Cedar Valley Middle (RRISD) | 6 |

## Round Rock Chickenpox Outbreak 10/07 - 12/07
## Epi Curve - by School




**What is an "Epi Curve"?** The epidemiologic curve, also know as an epi curve, is a visual display of an outbreak's magnitude and time trend. The x-axis is the date or time of onset of illness among cases and the y-axis is the number of cases. If an onset date is not known, the event date (usually the diagnosis date or a date associated with laboratory testing) is used in place of onset date.

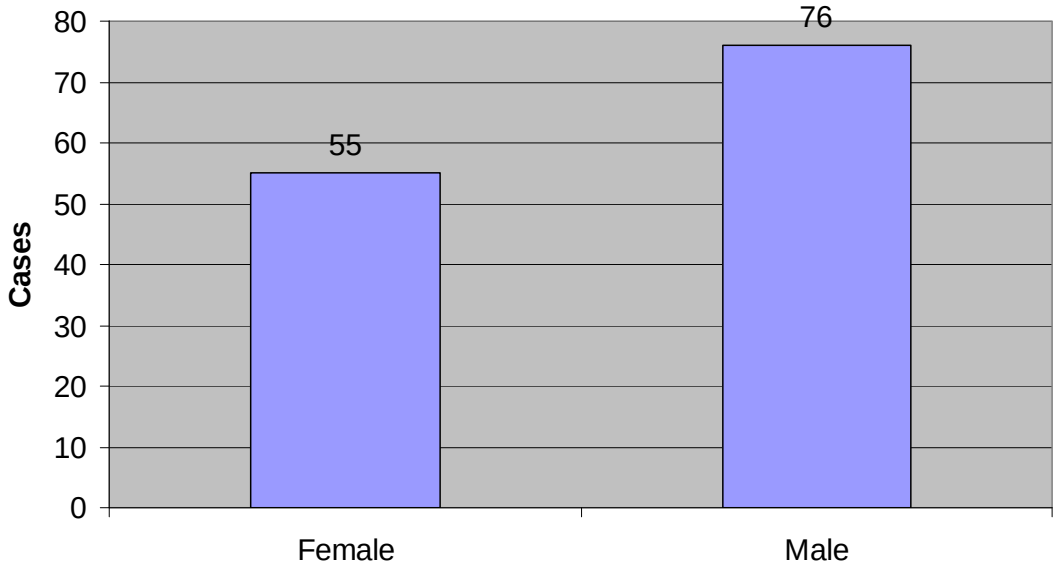
The outbreak started at Great Oaks Elementary in early October with multiple cases in a single family. The earliest onset of symptoms for this cluster was 10/9/2007 for a 5 year old girl. The 5 year old had a history of one varicella vaccination. The other children had a history of chickenpox and were unvaccinated. School health officials reported that these initial cases were not mild (>50 lesions). The secondary cases within the household had a dramatic impact on three different grade levels at Great Oaks Elementary (see Epi Curve – Secondary Cases at Same Address). By the end of the outbreak, seventeen families had reported 2 or more cases of chickenpox within the family.



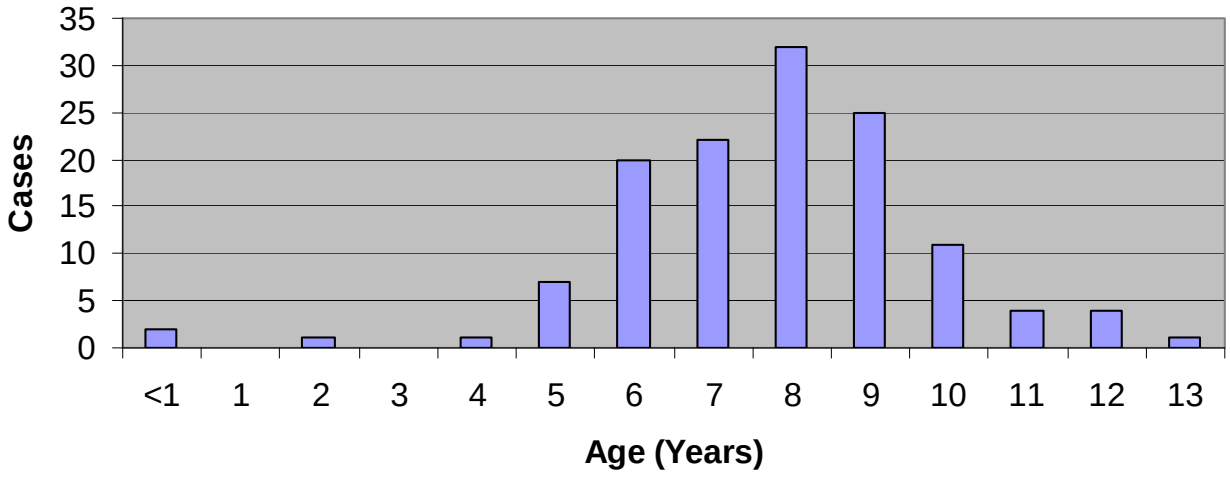

The majority of cases had an address with the city listed as either Round Rock (68) or Austin (62). One case reported their residence as Georgetown. The majority of cases occurred outside the actual city limits of Round Rock and Austin. The majority of the cases were clustered in neighborhoods immediately surrounding Great Oaks Elementary. Residential zip codes reported for cases associated with the outbreak were 78681 (63), 78717 (62), 78664 (4), 78665 (1), and 78626 (1).

More male cases (58%, 76/131) were reported than female. The majority (76%, 99/131) of cases were 6 to 9 years of age. Cases were reported from all elementary and middle school grade levels. Cases were reported from 37 classrooms at Great Oaks Elementary, 5 classrooms at Cedar Valley Middle School, and 1 classroom at Old Town Elementary. One case of varicella was reported for a teacher at Great Oaks Elementary.

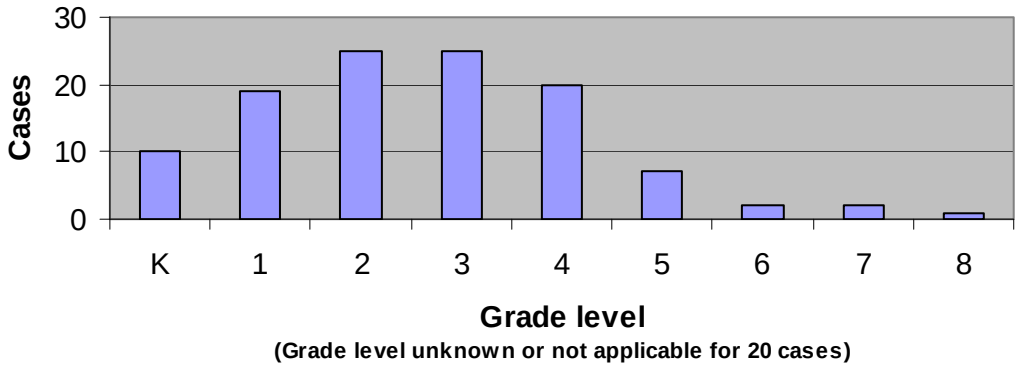
## Varicella Cases by Gender
## Round Rock Outbreak 10/07 - 12/07




## Varicella by Age (years)
## Round Rock Chickenpox Outbreak 10/07 - 12/07



**Varicella Cases by Grade Level**
**Round Rock Chickenpox Outbreak 10/07 - 12/07**



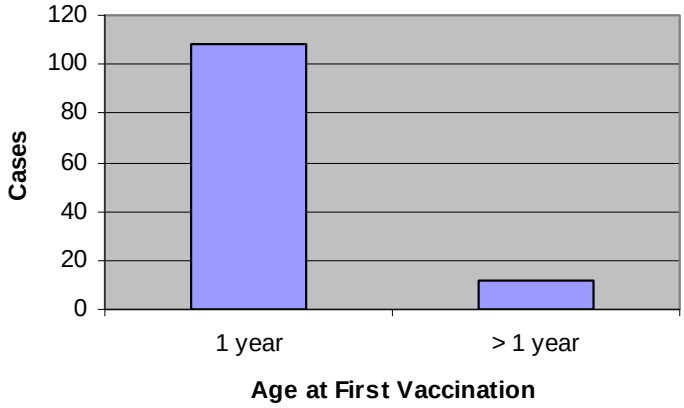

**(Grade level unknown or not applicable for 20 cases)**

The status of immunity to varicella was evaluated for each student at Great Oaks Elementary. Vaccination dates were verified using electronic immunization records provided by the school district. Prior to and during the outbreak, there was no school requirement for children to receive a second dose of varicella vaccine. Although the school requested updated immunization records from parents, school records may not have contained documentation for all booster doses of varicella vaccine. History of disease was also verified using school records.

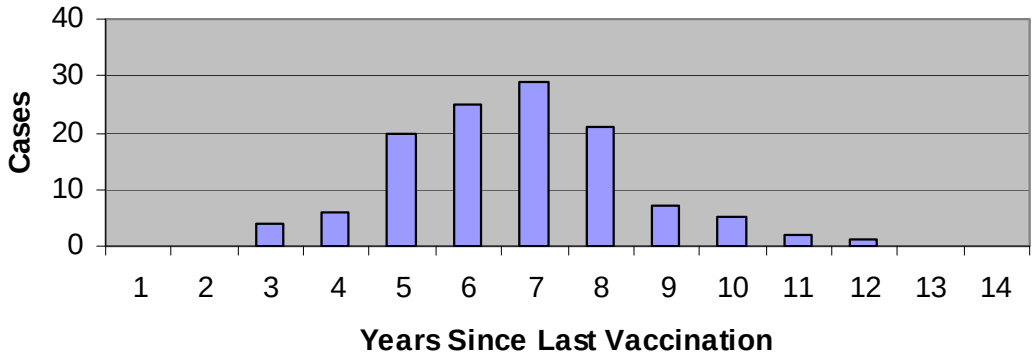
School district immunization records documented a history of varicella vaccination before the outbreak for 96.9% (991/1023) students in the school. Of these, 16.2% (166/1023) had a history of a second booster dose of varicella vaccine. History of chickenpox, as documented by a healthcare provider, was documented for 2.1% of students. 1.1% (11/1023) had no record of varicella vaccination or history of disease.

The majority (93.0%, 120/129) of outbreak cases old enough to be eligible for vaccination had documentation of one dose of varicella vaccine before the outbreak. Two cases (1.6%, 2/129) had documentation of a second dose of varicella vaccine before the outbreak. Both cases were 5 years of age when they received their second dose. Both received the second dose 3 years prior to their onset date for chicken pox symptoms. 3.9% (5/129) of cases had no record of vaccination but may have had a history of chickenpox before the outbreak. Four cases were unvaccinated due to a conscientious objection waiver.

**Age First Vaccination Administered**
**Round Rock Chickenpox Outbreak 10/07 - 12/07**




**Time (years) Since Last Vaccination**
**Round Rock Chickenpox Outbreak 10/07 - 12/07**




Students with chickenpox were excluded from school until lesions had crusted, and vaccine was offered at a special clinic on 11/13/2007. At this clinic, 126 doses of varicella vaccine were administered. All doses administered to Great Oaks Elementary students (101 doses) were booster doses. The remaining doses were administered to siblings and students from other schools in the district. Prior to the clinic, parents were referred to their health care provider.

**Limitations of Disease Surveillance Data**

Incomplete reporting of diseases may impact the quality and limit the usefulness of disease statistics. Even though disease reporting is mandated by law, the completeness of reporting for different diseases varies greatly. Disease trends over time based on surveillance data should be interpreted with caution. Changes in laboratory technology may lead to new Centers for Disease Control and Prevention (CDC) case definitions and classifications, thereby increasing or decreasing the number of cases reported. Finally, as more is learned about a disease, the clinical case definition may be updated. Whenever possible such changes should be noted when analyzing or displaying disease trends. Case counts and incidence rates within Texas should be interpreted with caution because different surveillance systems have varying capabilities to detect cases, and reporting might vary.

## Use of Geographical Information Systems (GIS) to Estimate Disease Burden

Disease surveillance in Williamson County is performed by two health departments, the Austin Travis County Health and Human Services Department (ATCHHSD) and the Williamson County and Cities Health District (WCCHD). ATCHHSD investigates suspect cases that lie within Austin's city limits and Williamson County. WCCHD investigates all other suspect cases in the county. WCCHD also investigates suspect cases that are outside Williamson County but lie within the city limits of Round Rock, Cedar Park, and Leander. To estimate the true disease burden for the county, disease reports from both ATCHHSD and WCCHD must be combined. If the home address of a case is known, the "home county" is determined using Geographical Information Systems (GIS) techniques. Limitations of GIS include the inability to precisely match and map all addresses (P.O. Boxes, private roads, incorrectly entered address data).

## Incidence Rates

Incidence is the number of new cases of a disease that arise during a specific period of time. In this report it is expressed as:

Incidence Rate = (# cases of a disease or condition reported for a year/population at risk) x 100,000
= reported cases per 100,000 population

Disease incidence rates are only calculated if there were more than five cases reported. The reliability of rates based on a low number of reported cases should be questioned. WCCHD utilizes the mid-year population estimates produced by the Texas State Data Center and Office of the State Demographer to calculate incidence rates. Surveillance data is usually available before official population estimates are published; therefore, this report may contain surveillance data for the most recent year, but not incidence rates.

**For questions contact:**

**David G. Bastis, MPH, Epidemiologist, 512-248-3257 ( dbastis@wcchd.org ) or the WCCHD Communicable Disease Management Team, 512-943-3660**

**Visit the WCCHD webpage for current year statistics:** http://www.wcchd.org

## Varicella Online Resources & References

General information on varicella disease and vaccine: **http://www.cdc.gov/vaccines/vpd-vac/varicella/**

Chickenpox case reports:
**http://www.immunize.org/reports/chickenpox.asp**
**http://www.dshs.state.tx.us/idcu/health/dpn/issues/dpn58n05.pdf**

Shingles Fact Sheet:
**http://www.cdc.gov/vaccines/vpd-vac/shingles/dis-faqs.htm**