



General Directorate of Health Affairs  
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## Chickenpox Surveillance Report, Qassim 2005-2015

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## **Chickenpox Surveillance Report, Qassim, 2005-2015.**

### **Summary**

Varicella or chickenpox is a highly infectious childhood disease, with high morbidity but low mortality and significant health care, social and economic cost. In otherwise healthy children, varicella is usually a self-limiting disease producing a long-lasting immunity, but subsequent reactivation may cause herpes zoster.

In Saudi Arabia, starting 2008, one dose of varicella vaccine is given to all 18 months children and a second dose after school entry, starting 2015.

During the period from January 2005 to December 2015, there were 38,629 notified chickenpox cases with a median number of 3390 cases in 2009. Cases declined dramatically with only 617 cases in 2015. Winter and spring had the highest number of notified cases. The most frequent reporting facility type was primary health care centers (PHCCs) followed by hospitals. Males and females were equally affected and 94% of cases occurred among Saudis.

Majority of cases (75%) were among children below 16 years and the proportion of cases among children had not changed much after introduction of the vaccine.

Although chickenpox cases are declining in number, the true impact of vaccination program may take few years to appear. To further control the disease, vaccination of special groups and strengthening the surveillance system are timely steps to face the changing disease epidemiology.

## **Chickenpox Surveillance Report, Qassim, 2005-2015**

### **Background**

Varicella Zoster Virus (VZV) is a DNA virus that causes a highly infectious childhood disease, varicella or chickenpox, with high morbidity but low mortality. However, health care, social and economic burdens are significant especially when considering infections among infants, adult, or pregnant patients. In otherwise healthy children, varicella is usually a self-limiting disease. Symptoms include fever and pruritic rash with macules, progressing to papules, vesicles and crusts. Lesions can be found in varying stages of development and resolution. Subclinical infection is uncommon. Varicella infection usually confers immunity for life. Following infection, the virus remains latent in neural ganglia; upon subsequent reactivation, usually much later in adult life, VZV may cause herpes zoster (shingles), affecting mainly immunocompromised individuals and older adults[1].

Transmission from patients with varicella is primarily via respiratory route. The incubation period is 10-21 days. Chickenpox is highly infectious with a secondary household attack rate of > 80% (range 61 – 100%). Without effective childhood immunization program, essentially all persons acquire varicella during their lifetime, most commonly during childhood[1].

In most climates, varicella shows strong seasonality with a peak incidence in late spring in temperate climates or in the coolest/driest months in tropical climates. Periodic large outbreaks occur with an inter-epidemic cycle of 2–5 years [1].

### **Surveillance System**

In Saudi Arabia, chickenpox is under routine Ministry of Health (MOH) surveillance since more than 30 years. All cases are diagnosed clinically by primary care doctors at PHCCs, hospital emergency rooms or private health care institutes.

Laboratory confirmation is not routinely done. The main collected variables are: age, sex, nationality, and location (PHCCs, district). Recently, the variable, 'immunization status' was added to the database. Cases are reported weekly from the diagnosing institute to the district then

to the Infectious Diseases Surveillance Unit at Qassim Regional Health Directorate. Control measures include advising cases to stay home, and limit interaction with other individuals. Contacts are advised to stay away from patients, wash hands frequently and watch for symptoms. Herpes zoster (shingles), the latent form of varicella zoster infection is routinely notified to the department of public health. The available notified variables are limited to essential demographic and geographic ones. A brief paragraph will describe the available epidemiologic picture.

### **Varicella Vaccine**

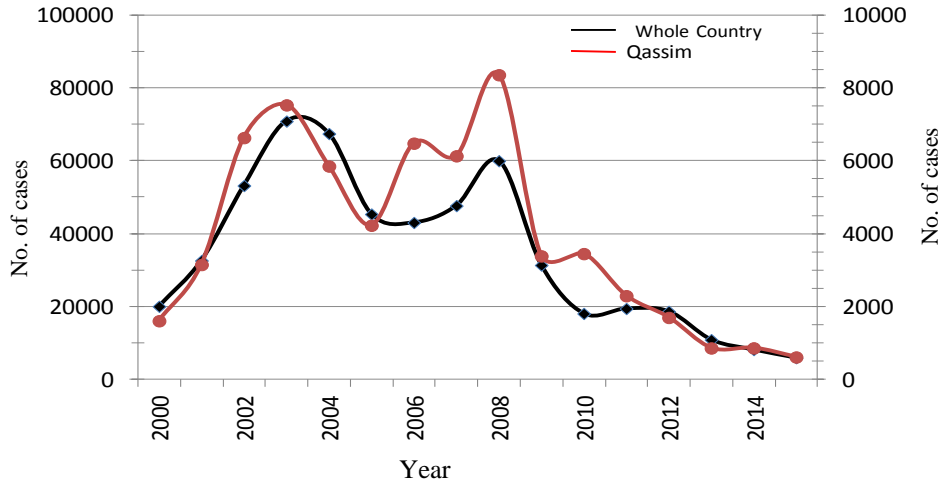
Varicella vaccine was introduced as part of Saudi MOH routine childhood vaccination program in the year 2008. Two doses of varicella vaccine are given to all children, the first is at the age of 18 months and the second is at school entry. The school entry dose had been planned from the introduction of the vaccine but had targeted only the 2008 birth cohort onwards, i.e. the second dose was first introduced in the year 2015.

Chickenpox surveillance report was published as a short communication article, covering its surveillance up to 2003[2]. The current report describes chickenpox epidemiology for the period of 2005-2015. The year 2004 data was lost due to a technical fault; hence 2004 data are excluded from this report. The report summarizes chickenpox and varicella zoster surveillance findings. We hope that it serves as a feedback communication to clinicians and public health staff, hoping they find it interesting and useful.

### **Results**

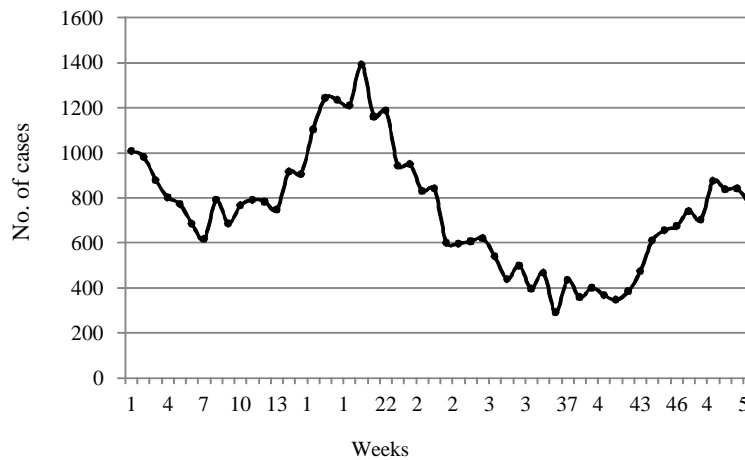
1. **Chickenpox:** During these 11 years period (2005-2015), there were 38,629 notified chickenpox cases, with the highest reported cases in the year 2008, 8,359, while 2009 had the median number of cases, 3390. Cases continued to decline with only 617 reported chickenpox cases in 2015 (Figure 1).

**Figure 1: Chickenpox Cases per Year, Qassim and Whole Country Trends Compared, 2000-2015.**



Cases were notified throughout the year but peaked during winter and spring while summer has the least number of reported cases (Figure 2). One small outbreak of chickenpox was reported among security forces young trainees. In a campus of 2051 trainees, ten cases occurred during one month period in 2013. The outbreak was controlled by isolation and education, but varicella vaccine was not used.

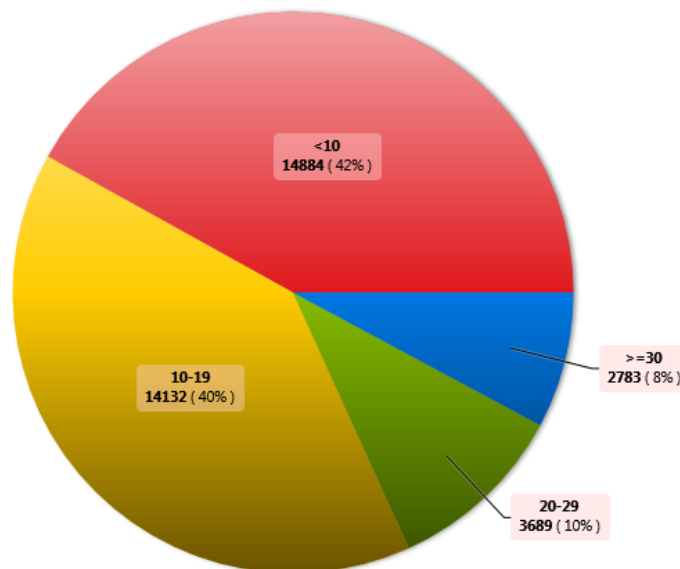
**Figure 2: Chickenpox Cases per International Week, Qassim, 2005-2015 (N= 38,629)**



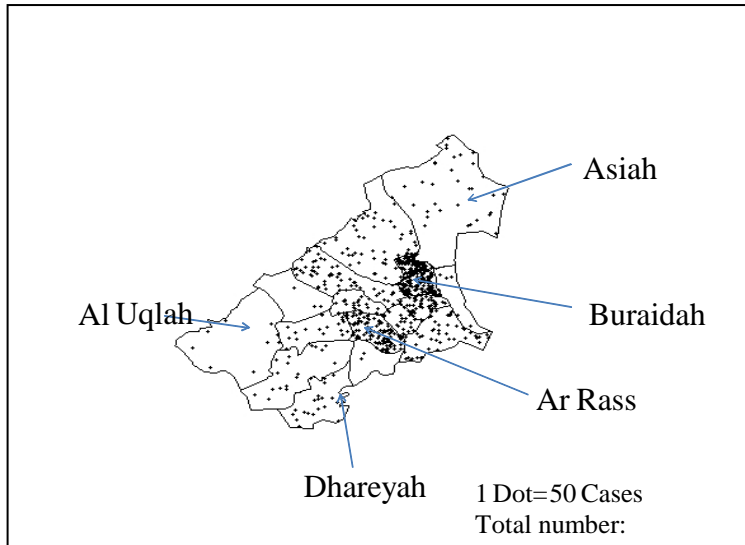
Primary health care centers were the most frequent reporting facility type followed by hospitals, 48% and 29% respectively (Figure 3). All age spectrum (0-99) had been affected, (Figure 4). The mean and standard deviation for the age of patients are 12.9 ( $\pm 10.2$ ) years, but 75% of cases were less than 16 years of age. Males and females were almost equal, 52% vs. 48% respectively. The majority (94%) of cases occurred among Saudis. Cases among expatriates tend to be among males (68%) and at an older age as 53% occurred among those who were > 20 years of age, while only 15% of cases among nationals occurred among those 20 years or older.

The rate range for cases per 1,000 was 2.0-9.4 per 1,000 inhabitants per year with a median rate of 4.1 per 1,000 population. As almost all individuals contract chickenpox, the median rate per 1,000 cohort per year is 339 cases. All district reported varicella cases in hundreds to thousands (Figure 5). District rates were highly variable, ranging from 2.4-9.4 cases per 1000 per year.

**Figure 4. Chickenpox Cases by Age group, Qassim, 2005-2015.**



**Figure 5. Chickenpox Cases by Reporting District, Qassim, 2005-2015**



**2. Herpes Zoster:** The data for herpes zoster could not be retrieved for the year 2011. Excluding 2011, there were 152 registered cases of varicella (herpes) zoster during that 10 years period. Median notified number of cases per year is 15, range 9-23. Age range of cases is (1-93 years) with a mean age of 41 years. Six cases occurred among patients below five years and 36 cases (23.8%) occurred among those 60 years or older. Two thirds of cases were males, 96 (63.6%), and about three quarters were Saudis, 109 (72.2%). Majority of cases were reported by hospitals, 120 (78.9%) cases.

### Comments

Childhood vaccination is free for all resident children in Saudi Arabia, regardless of the residency status or duration of stay. Furthermore, childhood immunization was compulsory in Saudi Arabia for more than 30 years. No birth certificate was to be issued except after completion of the first year immunization doses. It was in 2015 when that policy was cancelled. However, immunization completion is still mandatory for school entry. In addition, the last DPT, polio booster, 2<sup>nd</sup> MMR, and 2<sup>nd</sup> varicella doses are provided during the 1<sup>st</sup> few weeks of school enrollment by PHCCs staff at all elementary schools in the kingdom. These implementation

measures had made immunization coverage one of the highest in the world. Since varicella vaccine introduction in 2008, coverage with the first dose had been maintained above 90% except for the year 2013 when there was vaccine supply shortage and the coverage was only 61%.

As varicella is usually a mild childhood disease, the degree of surveillance completeness is unknown. Families may not consult health care providers for a mild self-limiting disease that has no specific treatment. Secondary cases within the family are even less likely to report to health facilities. Although cases can easily be recognized clinically, they may be confused with some other rash causing childhood diseases or drug rashes. The degree of physicians compliance with notification system is variable. Compliance is expected to be weak for mild cases and with very low or very high flow of patients. Furthermore, health care workers (HCW) in the Kingdom are mostly expatriates coming from different health systems with different notification pathways in their native countries. The degree of HCW turnover is also high. Infectious Disease Surveillance Units repeatedly orient new staff and re-orient older ones by field visits and periodic training sessions.

The overall chickenpox epidemiology picture had not changed since our previous report on this disease for the period 1999-2003[2]. Although chickenpox cases had markedly fell down following the introduction of varicella vaccine, this sharp decline can't be attributed to the vaccine alone, as the targeted cohort was those who completed their first year. The proportion of cases for young children had not changed much, neither for the year 2009 nor for the successive years, but the mean age for cases had gradually gone up from 11.9 in 2005 to 16.6 in 2015. This difference is statistically significant,  $P < 0.01$ . This change is likely to be explained by the vaccine while the sharp decline in 2009 was likely to be a natural disease epidemic trend. However, chickenpox continues to decline further to historical figures, both locally and nationally, suggesting considerable herd protection beyond the age groups targeted for vaccination[1].

Age and sex distribution among expatriates reflects the underlying distribution of their community, being mostly male adult workers.



District rate variability is explained by variability in compliance with notification system; an inherent issue in a very frequent mild infectious disease. This also suggests that the true number of cases is probably much higher than reported.

Future epidemics are likely to be small in number and to attack older individuals and unvaccinated children or those with vaccine failure. Hence, the overall morbidity is expected to slightly increase, as the complication rates in adults are higher than those in children[1]. As about half of adults in Saudi Arabia are expatriates, mostly unvaccinated, the control of chickenpox epidemics will be a real challenge.

A total of 692 cases had occurred among children at the pre-vaccination age of 12-18 months. Reconsidering the timing for the first varicella vaccine may help in decreasing this number. On the other hand, 30 cases were registered as vaccinated. Of these three are above 7 years which makes them unlikely to be vaccinated by the routine childhood vaccination program. The age of the other 27 cases can be accepted as within the target of the program at the time of each case notification. It may be difficult to assess varicella vaccine efficacy at present, as the history of vaccination had to be sought and documented for each case.

Current surveillance system does not require hospitals to report details about admitted cases, hence there are no data about mortality, hospital course, or complications and the disease burden on the secondary care is unknown.

Future surveillance and control activities may consider vaccinating health care workers and early response to possible outbreaks that may appear among school students, military camps, or expatriate workers, as the consequences may be serious. Post-exposure prophylaxis of close contacts with single-dose varicella vaccine may be considered when chickenpox declines further. Reports about admitted patients should be sought by public health departments as the disease epidemiology may change with advancing vaccination program. Closely monitoring complication rates and types will help in future disease control activities and in early recognizing and properly managing complications by clinicians.

## References

1. Varicella and herpes zoster vaccines: WHO position paper, June 2014. *Wkly Epidemiol Rec.* 2014 Jun 20;89(25):265–87.
2. Jahan S, Al-Saigul AM, Hamed SA. Five-year surveillance of chickenpox in Qassim, Central Saudi Arabia. *Saudi Med J.* 2007 May;28(5):808–10.