

Epidemiology Bulletin

REPUBLIC OF CHINA

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Changes in the Epidemiological Pattern of Rubella in Taiwan Area (I)

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I. Introduction

Taiwan is an island. Rubella is not considered endemic in Taiwan Area. There had been four major epidemics in Taiwan Area before 1977: 1943-44, 1957-58, 1968-69, and 1977, approximately one every ten years. Between epidemics, no case was reported. Grayston in 1967 made a retrospective study of the 1957-58 epidemic and found that 25% of pregnant women contracted with rubella during the first three months of pregnancy would deliver deformed babies.

A question is, more frequent contact with the outer world as a result of rapid economic development; whether rubella has become endemic in Taiwan Area. For effective prevention, a study on the trend of rubella is essential.

II. Materials and Methods

One each kindergarten, primary school, junior high school and college and university in Taipei City, Kaohsiung City, Taichung City, and Hualien City has been selected for study. To understand the difference in rural areas and aboriginal areas, one primary school in Nantou County and one junior high and one primary schools in Ilan County have also been selected for study. One class from each grade of the selected schools has been randomly selected for study. A letter is given to each student of the class selected for the consent of parents.

With the consent of parents, a team of physician and public health nurses visits the school on a schedule for blood taking with a 5 cc disposable syringe and needle at 3-4 cc per student. Blood specimens are placed vertically under room temperature for two hours before they are centrifugated by the health bureau technicians for blood serum. Serums are then placed in 5 cc plastic bottles in the freezer of the health bureau at 2°-8°C. They are then sent to the National Institute of Preventive Medicine next day in ice-box at 2°-8°C. They are then stored in a freezer at -20°C and tested by one technician of the Institute within a month by the enzyme-link-immunoabsorbant assay using Rubazyme reagent produced by the Abbott Laboratories.

In May 1987, another epidemiological study of serums of the antibody-negative cases blood-tested in 1986 was conducted. The procedure followed the same procedure of the previous study: consent of the parents, blood taking and isolation of serums in the same manner, and tested by the same technician of the National Institute of Preventive Medicine by the enzyme-like-immunoabsorbant assay for the antibody titer

To understand the epidemics of rubella in Taipei Area in the recent years, medical records of the National Taiwan University Hospital between January 1980 and July 1987 have also been studied to find out the number of diagnosed rubella cases in both the out-patient clinics and the wards. The diagnosis, however, is based on the clinical diagnosis of the physicians without any serological testings.

Data of rubella cases of the Mackay Memorial Hospital are taken from the information presented in the 15 February 1987 **Epidemiology Bulletin** by Dr Chiu of the Hospital. The data were collected between January 1984 and December 1986 at the out-patient clinics and serologically confirmed

The Department of Health, between November 1986 and October 1987 in Taipei City and Taipei County, made rubella a reportable disease on a pilot project basis. Both public and private hospitals and clinics in this area reported their clinically diagnosed rubella cases to the Department. Most cases are not serologically confirmed

In addition, the statistical report on diseases and injuries of the Taiwan Area between 1977 and 1985 issued jointly by the Taiwan Provincial, Taipei City, and Kaohsiung City health departments has also been studied. The method of statistical test used is

$$Z = \frac{(\bar{P}_1 - \bar{P}_2) - (\bar{P}_1 - \bar{P}_2 = 0)}{\sqrt{6 \bar{P}_1 - \bar{P}_2}}$$

III. Results

The blood-test began in early May of 1986 and completed a month later for 3,941 students. The results are shown in Table 4-1. No sexual difference is noted

**Table 4-1 Positive Rate of Rubella Antibody
in Taiwan Area by Age, 1986**

Age	No tested	No positive	% positive
< 6	265	196	26
7- 8	353	245	31
9-10	484	316	35
10-12	426	244	43
13-14	915	430	53
15-16	644	314	51
17-18	375	193	49
19-20	330	175	47
21-22	149	67	55

From Table 4-2, the age group older than 20 has the highest antibody positive rate, to be followed by the 11-20 and the 10-and-below age groups. The 10-and-below age group has a positive rate as high as 30%. This indicates that there was also epidemics in 1977-86 (see Table 4-2)

A further analysis of the positive rates by age for ages 5 to 10 years shows that the positive rates increase with the age. This finding seems to indicate that the infection is not a one-time infection during an epidemic but rather an endemic infection through years. From the linear regression function, it is found that age and the antibody positive rate are positively related ($r=0.88$). At $b=0.03$, it is estimated that each year around 3% of the children are infected with rubella (see Table 4-2A).

**Table 4-2 Positive Rate of Rubella Antibody
in Taiwan Area, 1986**

Age group	Total	No positive	% positive
< 10	1102	345	31
10-20	2690	1334	50
> 20	149	82	55

**Table 4-2A Positive Rate of Rubella Antibody Among
School Children Aged 5-10 Years, 1986**

Age	Total	No positive	% positive
5	109	26	24
6	127	24	19
7	163	43	26
8	190	65	34
9	209	70	33
10	275	98	36

A comparison of the rubella antibody rates of students in Taipei City in 1986 and the pre- and post-epidemic studies of serum antibody by Grayston in 1968 (Table 4-3) shows that prior to the epidemic in 1968, the antibody positive rate of students under 9 years of age in Taipei City was almost zero, it went up to 90% after the epidemic. The serological study in 1986 shows that the antibody rate of students under 9 years of age was as high as 30%. This indicates that there has been endemicity during these ten years.

**Table 4-3 Comparison of Positive Rates of Rubella Antibody
Between 1968 and 1986 by Age, Taipei City**

Age	Pre-epidemic in 1968		Post-epidemic in 1968		1986	
	% positive	No tested	% positive	No tested	% positive	No. tested
6	3	61	75	360	83	12
7	2	114	95	85	32	19
8	1	142	90	136	54	24
9	3	123	88	44	27	37
10	47	116	82	212	41	34
11	67	132	90	69	57	28
12	58	46	88	94	65	43
13	70	93	90	166	57	51
14	75	71	90	110	69	39
15-19	94	137	94	12	59	247
20-29	90	168	95	103	59	116