

# **Epidemiology      Bulletin**

REPUBLIC OF CHINA

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*Announcement*

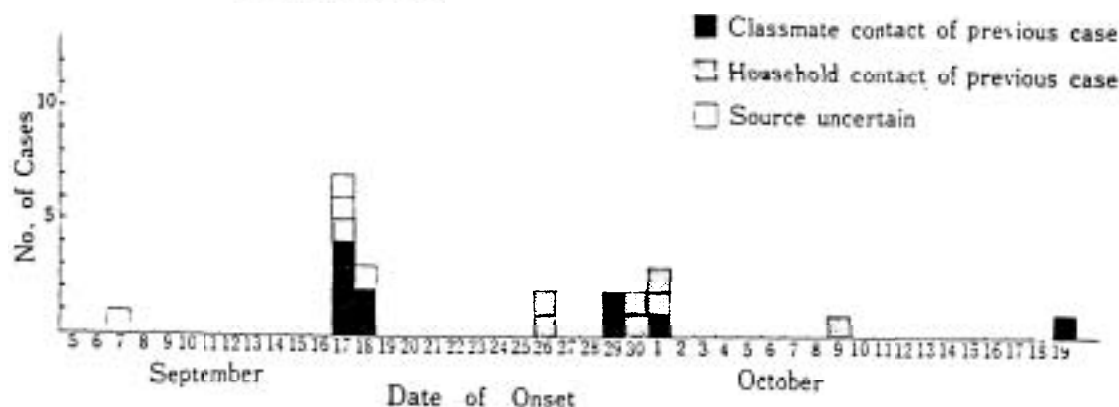
This issue marks the first anniversary of the *Epidemiology Bulletin*. During the past year, the *Bulletin* has featured many subjects of public health interest including outbreak investigations, surveillance reports, and summaries of relevant articles from international journals. The circulation of the *Bulletin* has increased from 2,000 copies for the first issue to the present level of 8,000 copies in Chinese and 600 in English. Since July 1985, the *Bulletin* has also been reproduced monthly in the *Taiwan Medical Journal* (circulation 14,000). The Bureau of Disease Control would like to take this opportunity to thank the City, County, and Provincial Health Departments for their help in improving surveillance and assisting in outbreak investigations. Your cooperation has enriched the content of the *Bulletin* and contributed significantly to the improvement of public health in the Republic of China.

## Measles Outbreak in an Elementary School

### – Chi Mei Island

During September and October 1985, an outbreak of measles occurred among elementary school students in Chi Mei Township, Penghu County (Pescadores Islands). The index case was a fourth grade female student with onset of rash on September 7. This student traveled by air to Kaohsiung City on August 21 and was taken to a hospital emergency room for a gastrointestinal illness and held overnight for observation. After discharge, she stayed with an aunt for 9 days during which time she had no contact with other children who had measles. She returned to Chi Mei on September 1 and attended school until September 4, when she developed fever. On September 17 and 18, 6 out of 42 of her classmates had onset of measles rash (Figure 1). Her 8 year-old brother, a second grade

Figure 1 Cases of measles by date of onset of rash, Chi-Mei Township, Penghu County, September-October 1985.



student, also had onset of rash on September 17. Another cluster of 9 cases occurred from September 26 to October 1, and involved mostly household (6) and some classroom (3) contacts of previous cases. Of the 21 measles cases in this outbreak, all had fever  $\geq 39.3^{\circ}\text{C}$ , generalized rash of  $\geq 3$  days' duration, and at least one of the following symptoms: cough, coryza, or conjunctivitis.

Eight (38%) measles cases in this outbreak had received measles vaccine. Excluding persons with a previous history of measles, there were 16 household contacts of measles cases who did not become ill. Twelve (75%) had received measles vaccine. Although vaccinated individuals were significantly less likely to become ill ( $p < .05$ ), the efficacy of measles vaccine was only 48% (vaccine efficacy is calculated as the difference between the attack rates in the unvaccinated and vaccinated groups divided by the attack rate in the unvaccinated). This is significantly lower than the 90-95% efficacy expected for measles vaccine<sup>1</sup>.

Household registration information was obtained from the Chi Mei Township Office to determine the names of all children 1-10 years of age. This information was compared with immunization records available in the Chi Mei Health Station (the only source of vaccine on the island) to determine the percent immunized with measles and other antigens. The immunization rate for measles vaccine was 57% among children 1-5 years of age, and only 38% among children 6-10 years of age, the age group in which the majority of cases occurred. Immunization rates for all other vaccines except BCG were lower in older children (Table 1).

Because immunization rates and vaccine efficacy were low, all non-ill children in grades K-9 were immunized against measles on October 10 and 11 with vaccine supplied by the Department of Health. After the immunization program, only one case of measles occurred in a child who was exposed to measles two days before vaccination.

*Reported by Chi Mei Health Station; Penghu County Health Bureau; National Institute of Preventive Medicine; Bureau of Disease Control, Department of Health, Executive Yuan.*

Editorial note: This outbreak illustrates several important obstacles to the control of measles in the Taiwan Area. First, the outbreak probably began with nosocomial transmission in the Kaohsiung hospital emergency room. Although no record of any patient with measles was found on the days the index case was in the emergency room, measles transmission

Table 1 Immunization rates by antigen and age group, Chi Mei Township, Penghu County.

Antigen	Age Group (years)	
	1-5 (n=489)	6-10 (n=501)
BCG	51%	55%
DPT-1	67%	61%
DPT-2	64%	54%
DPT-3	56%	49%
Polio-1	69%	57%
Polio-2	60%	50%
Polio-3 *	54%	22%
Measles †	57%	38%
Fully immunized	31%	13%

\*Polio-3 only available after 1982

†Measles only available after 1977

was occurring in Kaohsiung City in August, and one case was admitted to the hospital's pediatric ward from August 11 to 14. Neither the out-patient department nor the hospital emergency room routinely isolate suspect measles cases from other patients in the waiting areas. Surveillance by Chi Mei Health Station staff detected the first measles case in the elementary school, however, steps were not taken immediately to identify and immunize susceptible children.

The low efficacy of measles vaccine (48%) found in Chi Mei raises several important questions. Low efficacy can result if measles vaccine is not transported and stored at the proper temperature (4-8°C), or, if the vaccine is given at too young an age (<9 months). Of the 8 children with measles who had been previously vaccinated, 5 had vaccine records available in the Chi Mei Health Station. All were vaccinated in different years, and all received the vaccine at age  $\geq 12$  months. Measles vaccine in Chi Mei was stored in an unmonitored refrigerator which contained many routine medications as well as vaccines. Foods and beverages were also occasionally stored in the refrigerator. The measured temperature of the refrigerator was 4°C, however, leaving the door open for only a few minutes caused the temperature to rise above 8°C. Repeatedly opening the door for medications, foods or drinks could reduce the potency of temperature-sensitive vaccines, e.g., measles and polio.

The low measles immunization rates (38%) in children 6-10 years of age may partially be attributed to the unavailability of measles vaccine in Penghu County Health Bureau before 1977; only children currently <9 years-old would have been routinely vaccinated during early childhood. On the other hand, all children 1-5 years of age should have received measles vaccine, and yet only slightly more than half (57%) were immunized. The information from the household registration office in Chi Mei probably included some children who were no longer Chi Mei residents. If this number were large, the true immunization rates would be higher than those determined in the record review. We were unable to verify immunization rates by house-to-house survey because immunization cards have only been in use in Chi Mei for a few years and not all mothers retain these records.