

# **Epidemiology**      **Bulletin**

*REPUBLIC OF CHINA*

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## **Immunization Survey – Yun Lin County**

During the period January 27-30, an immunization survey was conducted among households in Yun Lin County to determine vaccination rates for children 12-23 months of age. Yun Lin, a predominantly rural county with one of the highest attack rates of polio during the 1982 epidemic<sup>1</sup>, was selected for the survey because vaccination rates might be low compared to other areas. To estimate vaccination rates with 95% confidence and  $\pm 10\%$  accuracy, a minimum of 210 children 12-23 months of age were identified in 30 clusters of approximately 7 children per cluster<sup>2</sup>. A pilot survey in Yun Lin County determined that each cluster should contain about 100 households to find 7 children in the target age group. The number of households in each census tract was obtained from each township registration office, and adjacent census tracts were grouped into clusters of approximately 100 households each. From these, 30 clusters were randomly selected for the survey. Interviewers visited all households in each cluster; households in which no one was home were revisited until all interviews were complete. Only children who lived in the household were included in the survey; those registered but who lived at other addresses were excluded. Vaccinations counted were those verified by government immunization card, or by health station or private medical record. Children counted as completely immunized were those who received all of the following vaccines: one dose of BCG, three doses of DPT and polio, and one dose of measles.

Among the 2,984 households visited, 252 children 12-23 months of age were identified (mean=8.4 per cluster, range=2-18). Immunization rates by antigen and dose are shown in Table 1. Measles vaccine had the lowest rate for any single antigen (79%). A total of 182 (72%) children were completely immunized. Of 229 who received one or more vaccinations, 171 (75%) were verified by government vaccination cards, and 58 (25%) by health station or private medical record. Minor illness (colds, fever, diarrhea, etc.) was the single most common reason why children were not completely immunized (37%). Both parents and health station staff admitted they were reluctant to immunize children with minor illnesses. Compared to completely immunized children, parents of children not completely immunized had lower educational and occupational levels, and were less

affluent as determined by the number with household luxury items (Table 2).

*Reported by Yun Lin County Health Bureau, Central Mobil Surveillance Team, Bureau of Disease Control, Department of Health, the Executive Yuan*

**Editorial Note:** This survey showed that about one-fourth of children 12-23 months of age in Yun Lin County had missed one or more immunizations, and of those immunized by health centers, only about three-fourths kept their immunization cards. Although the rate of completely immunized children may seem high (72%), it is probably not adequate to prevent outbreaks of highly communicable diseases like measles, polio, diphtheria and pertussis. Each year, children who are not immunized are added to the growing number of susceptibles in the population. When this number becomes large enough to sustain transmission, an outbreak occurs. In Yun Lin County, for example, approximately 16,000 children are eligible to be immunized each year. If only 80% are immunized, 3,200 children per year will be added to the susceptible population. If the immunization rate is

Table 1 Immunization rates by antigen for 252 children 12-23 months of age, Yun Lin County, Taiwan, January 1986.

Antigen	No. vaccinated	Percent
BCG	223	88.5
DPT-1	226	89.7
DPT-2	217	86.1
DPT-3	209	82.9
Polio-1	223	88.5
Polio-2	215	85.3
Polio-3	206	81.7
Measles	200	79.4
Complete	182	72.2

Table 2. Characteristics of completely versus incompletely immunized children 12-23 months of age, Yun Lin County.

Characteristic	Completely immunized (n=182)	Incompletely immunized (n=70)
Father's age (mean)	29	29
Mother's age (mean)	26	26
Father's education (% completed primary school)	70%	56%
Mother's education (% completed primary school)	48%	37%
Father's occupation (% white collar or higher)	12%	9%
Mother's occupation (% white collar or higher)	5%	2%
Luxury items (% having each item)		
Color television	98%	94%
Washing machine	90%	74%
Stereo system	42%	36%
Automobile	22%	14%
Video tape recorder	17%	19%
Air conditioner	13%	11%

increased by just 10% (to 90%), the number added to the susceptible population each year will be reduced by half to only 1,600 children. Increasing the rate another 5% (to 95%) again reduces the annual number of susceptibles by half to only 800 children. This simple example illustrates the importance of making sure every child eligible is fully immunized.

One important factor leading to missed immunizations in Yun Lin County is the tendency for parents and health center staff not to vaccinate children with minor illnesses. Studies have shown that BCG, DPT, polio and measles vaccines can be safely and effectively administered to sick children, including those with fever, respiratory infection, diarrhea, and even severe malnutrition<sup>3</sup>. The World Health Organization (WHO) recommends that all opportunities should be used to immunize eligible children<sup>3</sup>. Postponing immunization should only be considered if a child is severely ill and requires hospitalization. Even in this situation, the risk of hospital-acquired vaccine-preventable diseases must be weighed. Health center staff should explain to parents that it is safe to immunize children with minor illnesses. If parents refuse, or the child is severely ill, a special effort must be made to follow-up these children since our data indicate many do not return to be immunized.

It is not surprising that complete immunization rates were lower among children with parents of lower educational and socioeconomic levels. Similar findings were reported in Yun Lin County during the 1982 polio epidemic: polio was associated with low rates of immunization, and the fathers of cases tended to have lower educational and occupational levels<sup>1</sup>. The data from both surveys point out the need to identify and educate parents of lower education and income levels about the importance of completing the immunization schedule.

An important limitation of this survey is that it does not provide information about children registered in Yun Lin County who reside temporarily in other areas. This group may be quite large; in the pilot survey, 40% of registered children did not live at their registered address. This gives rise to two problems. First, many families, especially those with young children, temporarily live in urban areas for work. Local health center staff do not consider such children their responsibility. Little effort is therefore made to follow-up these children and ensure they are immunized. In most cases, follow-up is possible because family members at the registered address usually know where absent children live. The second problem is that health center staff in large urban areas immunize children of temporary residents and sometimes fail to notify local health authorities in the township where the child is registered. These two problems seriously impede our ability to monitor the effectiveness of the immunization program. Cooperation between health center staff at all levels of the public health system is essential for maintaining high levels of immunization. Local health center staff should follow-up children who are living temporarily in other areas, and health center staff who immunize children from other areas should notify local health authorities.

### **References**

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