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Measles Outbreak in a Junior High School in November-December 1998

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Measles is a vaccine-preventable disease, and a target of the Expanded Program of Immunization (EPI). The WHO estimated that in 1997 the mortality due to measles amounted to 960,000 (1). In Japan, measles cases were estimated to be 160,000-810,000/year in 1980s (2) and to be 65,000-460,000/year in 1991-1998 (3). Though the frequency of large outbreaks has lately been seen to decrease, measles remains an important EPI target disease in Japan.

From the end of November to the end of December 1998, an outbreak of measles occurred in a junior high school in Tokyo. Among 630 students enrolled in the school, 28 were diagnosed as having measles. The measles virus was isolated from four patients by using B95a cells (4). Among 476 students who responded to our questionnaire, 345 (72.4%) had received measles vaccine and 61 (12.8%) had past histories of measles. Among the 345 vaccinees, only two students were affected by the present measles outbreak (0.6%). On the other hand, among 59 non-vaccinees without past histories of measles, 22 students were affected (37.3%), indicating that the present outbreak affected mainly non-vaccinees. The number of measles patients among vaccinees was 2 in 345 (2.6%) (Table 1). The two students with histories of measles vaccination had measles in the present outbreak. It was not clear whether this was due to a primary vaccine failure or secondary vaccine failure (5).

We measured the HI antibody titers of 174 students by HI test (6) three months after the outbreak. The average HI titer in the group with histories of natural infection was 82, while that in the vaccinees was 32. It was evident that the vaccination could not elevate the antibody titer to the level obtained by natural infection. The distribution of serum HI titers of 169 students who escaped the outbreak is shown in Figure 1. Among 130 vaccinees in this group, 19 (15%) had no detectable HI antibody and 74 (56.9%) had only low levels of the antibody (x8-16). Namely, 72% of the vaccinees had no or showed only low levels of measles antibody. It was suggested that an outbreak of this size had no booster effect on the herd immunity, producing a condition for secondary vaccine failure. This may be related to the recent increase of measles cases among the adults (7).

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REFERENCES
5. Hirose, M., Hidaka, Y., Miyazaki, C., Ueda, K. and

<table>
<thead>
<tr>
<th>Table 1. Clinical history of the junior high school students</th>
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<td>Vaccinees</td>
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<td>Total (476)</td>
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<td>With history of measles before outbreak (61)</td>
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<td>Measles in the present outbreak (28)</td>
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<td>HI titer measured (174)</td>
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