

Steps toward Measles Eradication in Japan— Why does Fukui Prefecture have high vaccination rates?

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Introduction

According to amendments made to the Preventive Vaccination Law, a 2-dose vaccination program of measles-rubella combined vaccine (MR vaccine) was instituted in Japan in 2006. Under this new program, the first dose is to be given during the first phase (age 1) and the second dose is to be given during the second phase (ages 5–6). In Fukui Prefecture, the MR vaccination rate was 91.4% (the ranked highest among 47 prefectures of Japan) in 2006 and 94.4% (ranked third) in 2007. Since 2008, two additional phases were added to the program as a complementary measure for the schoolchildren who underwent the previous 1-dose program, to allow the second dose to be administered during either phase. The third phase was set for ages 12–13 and the fourth phase was for ages 17–18, each corresponding to the 1st grade in junior high school and the third grade of senior high school in Japan, respectively. In Fukui Prefecture, the vaccination rates for the third and fourth phases of MR vaccination at the end of December 2008 were 87.7% and 81.4%, respectively, also ranking first in the nation. Additionally, more than 95% of 2-year-old children in all 17 cities and towns complete the first dose of MR vaccine. In this prefecture, the MR vaccination is basically administered through individual vaccination, whereas mass vaccination is used for the third phase as an exceptional case in 4 of the 17 municipalities. These data from Fukui Prefecture demonstrate that individual vaccination can achieve sufficiently high vaccination rates. How this success has been achieved is described below.

Direct Encouragement to Eligible Non-vaccinees

Vaccinees' parents have various attitudes in regard to routine vaccination, ranging from very positive to rather reluctant. People who have a positive attitude toward vaccination bring their children when they receive a notice from the authority. Therefore, it is not difficult to achieve a vaccination rate of 60–70%. However, it is necessary to encourage reluctant parents to reach 90% and above. Efforts to inform an unspecified majority by means of leaflets, posters, and newspaper articles are not often effective. Thus, non-vaccinees of the eligible ages must be identified and their parents need to be given individual encouragement directly.

Direct encouragement to eligible non-vaccinees is important to achieve high vaccination rates. This requires a system that allows easy access to the information of eligible non-vaccinees. To this end, developing and maintaining proper vaccination ledgers is highly desirable.

Organizing the Vaccination Ledger System

In Fukui Prefecture, the prefectural pediatric association has been conducting surveys on the vaccination rates in all cities and towns since 2003 based on vaccination ledgers. A vaccination ledger includes entries such as the names, addresses, and birth dates of eligible vaccinees, in addition to the dates of vaccination, lot numbers of the vaccine given, and the names of the attending physicians. When a vaccination ledger

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Table 1 The numbers (and percentages) of vaccinees in City A

(%)

Age (yr)	Number of residents	Already vaccinated with												
		BCG	Polio		Diphtheria-Pertussis-Tetanus (DPT)				Measles	Rubella	MR 2	Japanese encephalitis		
			1st	2nd	1st	2nd	3rd	Booster				1st	2nd	Booster
0	760	532 (70)	172 (23)	0 (0)	417 (55)	351 (46)	261 (34)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
1	770	753 (98)	724 (94)	489 (64)	737 (96)	724 (94)	705 (92)	137 (18)	615 (80)	614 (80)	0 (0)	1 (0)	0 (0)	0 (0)
2	757	743 (98)	736 (97)	707 (93)	732 (97)	724 (96)	716 (95)	536 (71)	730 (96)	728 (96)	0 (0)	0 (0)	0 (0)	0 (0)
3	780	760 (97)	764 (98)	751 (96)	758 (97)	755 (97)	737 (94)	660 (85)	733 (94)	732 (94)	0 (0)	14 (2)	11 (1)	0 (0)
4	837	813 (97)	824 (98)	816 (97)	814 (97)	806 (96)	790 (94)	737 (88)	802 (96)	788 (94)	0 (0)	28 (3)	25 (3)	1 (0)
5	813	791 (97)	801 (99)	799 (98)	793 (98)	792 (97)	779 (96)	733 (90)	790 (97)	782 (96)	3 (0)	88 (11)	57 (7)	6 (1)
6	833	802 (96)	807 (97)	805 (97)	805 (97)	798 (96)	779 (94)	770 (92)	795 (95)	780 (94)	757 (91)	622 (75)	553 (66)	117 (14)
7	847	803 (95)	812 (96)	809 (96)	805 (95)	800 (94)	781 (92)	770 (91)	792 (94)	785 (93)	752 (89)	746 (88)	721 (85)	489 (58)

Note: The number of children who received the MR vaccination at the first phase was entered in both the columns of measles and rubella. (Data are as of March 31, 2008)

is maintained and updated properly, a summary output like **Table 1**, which shows the accurate numbers and percentages of completed vaccinations, can be produced by simply aggregating data of vaccinees by age and type of vaccine provided. Conversely, the number of eligible non-vaccinees can be easily available—and most importantly, a list of their names and addresses is readily available from computers.

In essence, the development and maintenance of vaccination ledgers enables us to accurately determine the percentage of complete vaccinees and find eligible non-vaccinees. This facilitates direct encouragement and consequently leads to a high vaccination rate.

This method of Fukui Prefecture had been employed for 5 years before the new vaccination program was legislated. The author believes this experience allowed Fukui Prefecture to adapt to the newly started second, third, and fourth phases of the MR vaccination program, achieving high vaccination rates as a consequence.

Vaccination Rates for the Third and Fourth Phases of MR Vaccination

Figure 1 shows the vaccination rates of the third phase of MR vaccination by municipality as of

December 2008. Four names of cities and towns in box indicate mass vaccination, however, 90% of vaccinees throughout the prefecture received individual vaccination. **Figure 2** shows the results of the fourth phase of MR vaccination, which was conducted by individual vaccination in all cases. The results of Katsuyama City (population 30,000 approximately) are noteworthy. Already by the end of June, the vaccination rate at the third phase was already 91.2%, and that of the fourth phase was 84.1%; all by individual vaccination. By the end of December, the corresponding vaccination rates reached remarkable figures; 97.5% and 90.7%, respectively.

According to the person in charge in Katsuyama City, these high vaccination rates were obtained through series of efforts. First, a notice of MR vaccination was sent to each eligible vaccinee in March as a campaign to promote vaccination during spring vacation. Also, a liaison meeting was held with schools to ask for their cooperation to provide students with education and guidance about vaccination. Then, as early as May, non-vaccinees were sorted out to encourage vaccination via direct mails. Eventually, telephone calls were made to each non-vaccinee from the child's attending school and the City. Thus, the explanations for the high vaccination

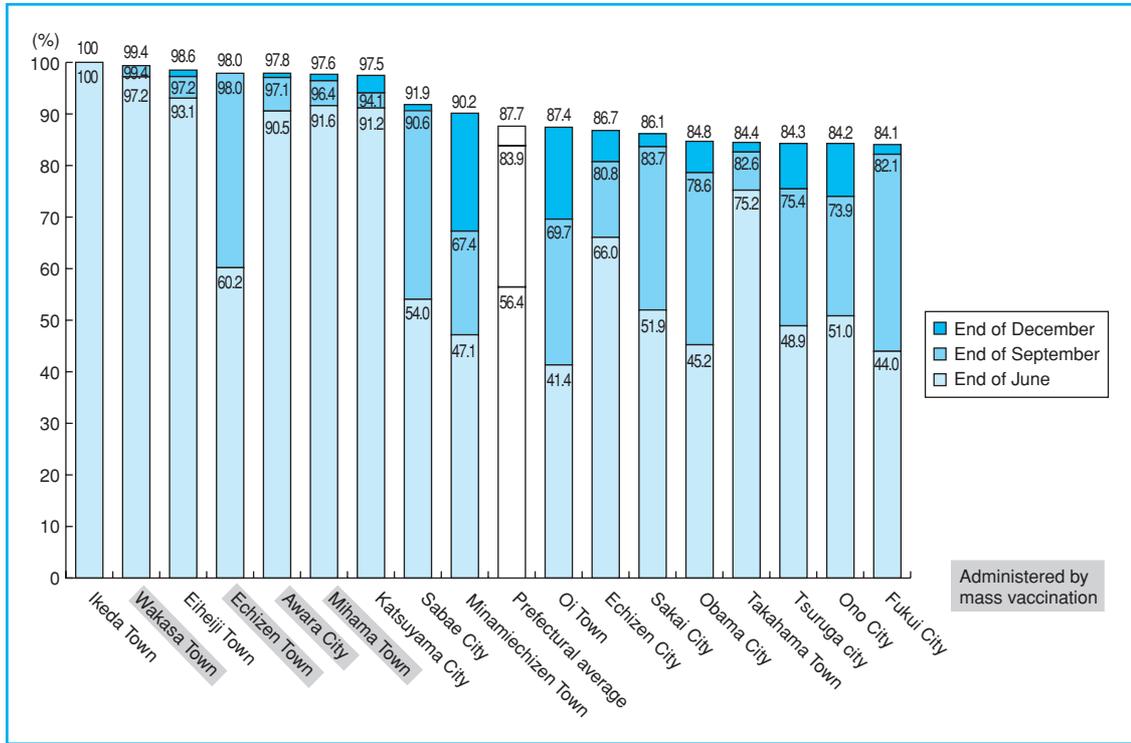


Fig. 1 MR vaccination rates at the third phase in FY 2008 (at the end of December)

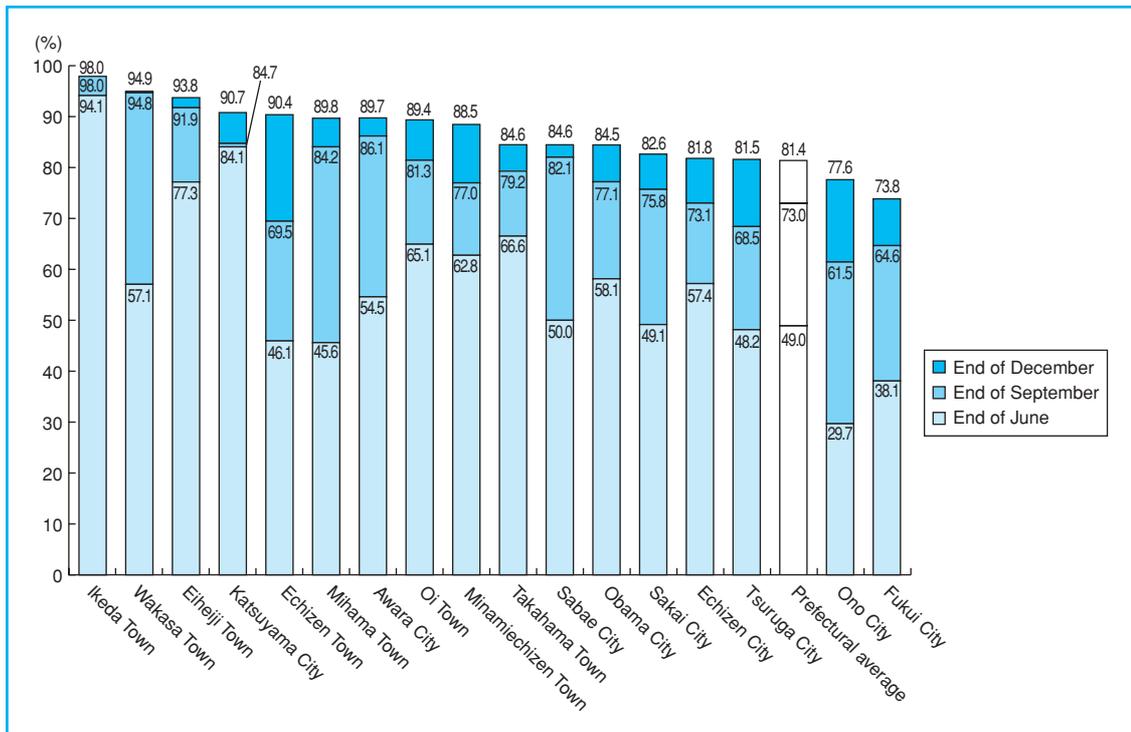


Fig. 2 MR vaccination rates at the fourth phase in FY 2008 (at the end of December)

rates for Katsuyama City were early implementation, cooperation between of the authority and schools, and direct encouragement to eligible non-vaccinees.

Promotion of the Vaccination Ledger System

If vaccination ledgers are managed properly not just for measles vaccination but also for all other routine vaccinations, it is possible to obtain accurate percentages of vaccinees among municipalities and to give encouragement directly to eligible non-vaccinees. It is important to establish such a system.

In Fukui Prefecture, some municipalities had no vaccination ledger or had not properly managed it if any, until 6 years ago. However, the pediatricians in the area approached the local government, and with the support from the Prefecture, a current system was established within the following year. Since many people move in and out in heavily populated areas, the management of vaccination ledgers may become cumbersome. But, good ledger management is a matter of volition. In fact, Himeji City with a population of 500,000 has an excellent management system in operation. It is highly desirable that all municipalities in Japan to establish good management system for vaccination ledgers.

Recommendations on Mass Vaccination

Recently, the opinion that MR vaccinations at the third and fourth phases should be carried out by mass vaccination is becoming stronger throughout the nation. The primary reason is that individual vaccination is likely to fail in achieving high vaccination rates. However, the success of Fukui Prefecture proves that is not always the case. The secondary reason is that, since these phases of MR vaccination are a temporary measure to be continued for only 5 years, the mass vaccination

strategy should be used as necessity, considering the importance of the social significance in vaccination. This second reason is persuasive.

In terms of the administration of mass vaccination, there are two different voices. One is that mass vaccination should be administered at the end of a fiscal year only if individual vaccination fails to achieve sufficient vaccination rates. The other is that mass vaccination should be administered from the beginning of a fiscal year. Recently, the latter opinion is being more favored. It is not unusual to hear the rather simplistic idea that mass vaccination should be used from the beginning of the next fiscal year because individual vaccination yielded only low vaccination rate this year.

The most important educational aspect of the third and fourth phases of MR vaccinations is that it provides a good opportunity to educate students of the significance and importance of vaccination so that they may willingly decide to visit a medical facility to receive vaccination. Such experience of decision making itself is a valuable lesson, too. However, at present, a large proportion of students have insufficient understanding of the significance and importance of vaccination. Such education requires much energy, but the educational aspect of vaccination could be ruined if the mass vaccination strategy is employed too hastily. It is doubtful that children who have no sufficient education or positive experience of vaccination will actively have their children vaccinated when they become parents.

It is important that we keep a long-term vision for solid and continuous education that will encourage individuals to be vaccinated of their own volition. At present, we must emphasize on increasing the vaccination rate, for it is a pressing short-term goal. When “a mass vaccination was chosen unfortunately,” we should take it as a sort of painful reminder for our lack of efforts and shall prepare ourselves to do better with individual vaccinations for the next year.

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