



RESEARCH PAPER



## A survey of Japanese mothers on the effectiveness of the Ministry of Health, Labor and Welfare's revised HPV vaccine leaflet

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### ABSTRACT

**Introduction:** In June of 2013, Japan's Ministry of Health, Labor and Welfare (MHLW) suspended its position of strong recommendation for the routine immunization of young girls against the Human Papilloma Virus (HPV) because of reports of adverse reactions after the vaccination. For the next four years, the MHLW's website warned about the significance of these adverse events. In January of 2018, MHLW's website was modified to reflect a less negative stance. We have studied public awareness of MHLW's revised leaflet in Japanese women whose daughters were of the targeted age for receiving the HPV vaccine and how this awareness influenced their intentions to get their daughters vaccinated.

**Materials and Methods:** From June to December of 2018, a survey was conducted through the Departments of Obstetrics and Gynecology at 14 different medical facilities. The questionnaire was distributed to women whose daughters were of the HPV-vaccine-targeted age. The survey measured their responses before and after being presented with the 2018-revised MHLW leaflet. Responses from 384 mothers were analyzed.

**Results:** Before being presented with the leaflet, the survey found that the percentage of responder's daughters already vaccinated was 6.5% (24/372). After reading the MHLW leaflet, an additional 6.9% (24/346) responded "I want to get my daughter vaccinated immediately", and 37.6% (130/346) responded "I have positive feelings about HPV vaccination".

**Discussion:** By presenting the new MHLW leaflet at obstetrics and gynecology facilities, we expect to be able to effectively increase the HPV vaccination rate in Japan.

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## Introduction

Beginning in 2000, the age-adjusted incidence of cervical cancer in Japan has been steadily increasing, a trend not seen in any other advanced country. The age-adjusted rate was 9.1/100,000 in 2000, but had already climbed to 14.1 by 2012. Changes in sexual lifestyle have been causing the spread of HPV infection in ever younger women, and the consistently low rates of HPV vaccination and cervical cancer screening in Japan have all contributed to the current dismal status.<sup>1</sup>

In 2007, Australia became the first country to initiate a national HPV vaccination program; today both HPV vaccination and cervical cancer screening rates are extremely high there. It is projected that the annual incidence of cervical cancer in Australia will decrease to fewer than six new cases per 100,000 women by 2020, and to fewer than four cases per 100,000 women by 2028.<sup>2</sup>

In fiscal year (FY) 2010, Japan's own Ministry of Health, Labor and Welfare's (MHLW) HPV vaccination program started off promisingly enough, such that by April of 2013 the HPV vaccine

had become a nationally-recommended routine immunization for girls ages 12–16. The total cost of HPV vaccination in Japan was 50,000 yen (\$45 US), but with public funds, it was free for girls who are 12–16. However, in June of 2013, just two short months after becoming a recommended national vaccination, repeated reports in the media of cases of post-vaccination adverse events occurring in young girls appeared; those events included widespread pain and movement disorders. Out of an abundance of caution, until its safety could be better shown, the MHLW quickly announced a temporary suspension of its recommendation for routine HPV immunization.<sup>3–6</sup> Subsequently, the rate for newly vaccinated girls in 2013 plummeted, from approximately 70% in 2012, to 1.1% for girls aged 12, and to 3.9% for girls 13. In 2014, the rate fell to under 1% for girls aged 12.<sup>4,7</sup>

On the MHLW website, their advisory leaflet posted in 2014 discussed the significance of the adverse events associated with HPV vaccination. It contained the headline, "If you have any symptoms, or you are worried after your vaccination, please consult with your parents". The content of the 2014 leaflet was obviously strongly sensitive to the reported

adverse events of 2013. Fortunately, in January of 2018, the leaflet was modified to provide a less negative, calmer message: “Check for and consider the significance and effects of possible symptoms after vaccination”.<sup>8</sup>

The purpose of this current study was to gauge the awareness of Japan’s mothers of young vaccine-eligible girls to the latest MHLW leaflet and how that awareness might affect their intention to get their daughters vaccinated. We surveyed women, visiting the Departments of Obstetrics and Gynecology at 14 different medical facilities, whose daughters were of age 12–16, the targeted age for HPV vaccination. At the same time, we evaluated the role of Japan’s gynecologists in promulgation of the HPV vaccine – in light of the current state of MHLW’s continued suspended recommendations for HPV vaccination.

## Materials and methods

From June to December of 2018, a survey questionnaire was distributed to 447 women who visited the Departments of Obstetrics and Gynecology belonging to one of the 14 facilities belonging to our Obstetrical and Gynecological Society of Osaka. The Institutional Review Board of Osaka University approved this study. Researchers belonging to the Osaka University sent paper MHLW leaflets and questionnaires to each facility. The survey was given only to women whose daughters were of the HPV–vaccine-targeted age (12–16).

The obstetricians and gynecologists at each facility conducted a questionnaire survey before and after explaining the contents of the MHLW leaflet to the women. The leaflet discussed the “significance/effect” of HPV vaccination, the symptoms that might occur after vaccination, and guidance on reports of side diverse symptoms and remedies. The leaflet noted that the reported adverse symptoms, of pain, numbness and involuntary movement, also occurred at similar rates in girls who had not received the HPV vaccine.

The survey investigated the mothers’ attitudes before and after they had read the MHLW leaflet (Figure 1). The questionnaire consisted of four questions: Q1: What did you think about vaccinating your daughter (before the leaflet was

presented)? Q2: Were you already familiar with the MHLW leaflet? Q3: (after the leaflet was presented) What do you think now about vaccinating your daughter? Q4: Was it easy to understand the MHLW leaflet?

For Q1, the response options were “Vaccination is important, and I have already had my daughter vaccinated”, “Under this suspension of recommendation, I would vaccinate my daughter without any specific preconditions”, “Vaccinate immediately after a restart of the recommendation”, “Vaccinate after friends or acquaintances have been inoculated”, “Vaccinate after many girls of same age group have been inoculated”, “Don’t know” and “Won’t inoculate”. Q2 was a closed YES or NO question. For Q3, the response options were “I want to get my daughter vaccinated immediately”, “I have become positive about vaccination”, “I don’t know” and “I won’t inoculate”. For Q4, the response options were “The information I want to know is posted and easy to understand”, “The information I want to know is posted, but difficult to understand”, and “The information I want to know is not posted”. Survey responses with multiple answers, or no answers, to questions 1–4 were excluded from the analysis.

## Statistics

Fisher’s exact test or the chi-square test were used for statistical analysis; the level of statistical significance was set at  $p = .05$ .

## Results

We received responses from 384 women who had visited one of our 14 facilities across Osaka (10 clinics, 3 hospitals, 1 unlabeled).

Of the 384 distributed surveys, after excluding one returned with a non-answer and nine more with multiple responses, the remaining 374 surveys were analyzed. Of these, in response to Q1, 6.4% (24/374) said that “Vaccination is important, and I have already had my daughter vaccinated”. Another 4.0% (15/374) responded, “Under this suspension of recommendation, I would vaccinate my daughter without any specific preconditions.” Combined,

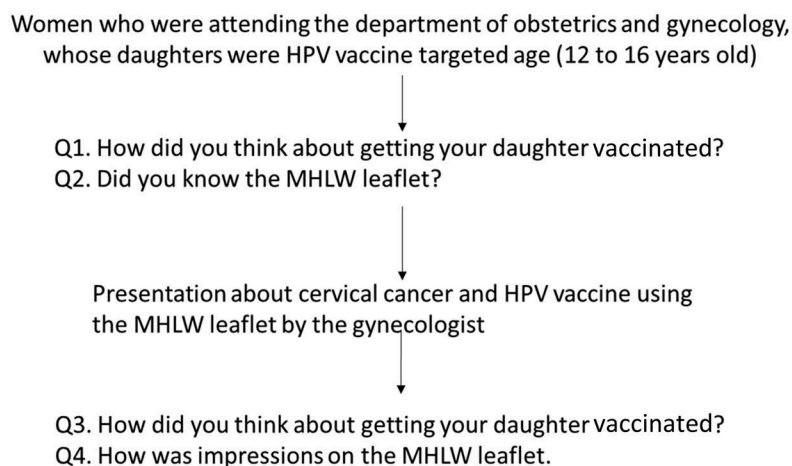


Figure 1. Survey procedure.

39.3% (147/372) of the women who responded had some form of precondition requirement, either that they would “Vaccinate immediately after a restart of the recommendation”, “Vaccinate after friends or acquaintances have been inoculated”, or “Vaccinate after many girls of same age group have been inoculated”. Upon reading the MHLW leaflet, 9.6% (36/374) said they were already familiar with it. However, there was no relationship between any prior awareness of the MHLW leaflet and their intention to get their daughters vaccinated.

We excluded the responses from 24 mothers whose daughters had already been vaccinated, along with three responses with non-answers and 11 with multiple responses. 346 mothers were analyzed at this point: 6.9% (24/346) responded “I want to get my daughter vaccinated immediately”, and 37.6% (130/346) responded “I have become positive about vaccination”. In total, 44.5% (154/346) responded positively to vaccination after being presented with the leaflet by their obstetrician or gynecologist.

### Understanding of the MHLW leaflet

Excluding five surveys with non-answers and four with multiple responses, 375 mothers were analyzed: 74.1% (278/373) answered “The information I want to know is posted and easy to understand”. However, 17.3% (65/375) answered “The information I want to know is posted, but difficult to understand” and 8.0% (30/375) responded “The information I want to know is not posted”.

### Discussion

With the cooperation of 14 facilities associated with the Obstetrical and Gynecological Society of Osaka, we conducted a survey of their clients, of mothers whose daughters were of the HPV vaccine-targeted age. We asked them about their awareness of the revised MHLW leaflet and what their intentions were for getting their daughters vaccinated. The questionnaire did not ask their reasons for coming to the clinics. It is noteworthy that the percentage of women whose daughters

had been already vaccinated for HPV was 6.4%, whereas the nationwide vaccination rate for Japanese girls of this age is less than 1%.<sup>7</sup>

Since the national vaccination rate for girls born since FY 2000 has been reduced to nearly 0%, the risk of HPV infection in Japan has retreated to almost the same level as for the generation of women living prior to the introduction of the HPV vaccine. Despite the woeful fact that the MHLW had not yet resumed its governmental recommendation, activities to promote HPV vaccination must continue to be promoted at the local physician level.<sup>9</sup> Gynecologists need to better educate mothers about HPV vaccination, and this can begin by using the MHLW leaflet. We expect that more vaccinations can be encouraged if more gynecologists nationwide would begin routinely presenting the MHLW leaflets to all their patients, which would counter the current negative climate against the vaccine.

From our previous survey about perceptions regarding vaccination decision making, it turns out that decisions are generally not being made rationally, rather they are being based on ambiguous concepts, such as “everyone around me is vaccinated” rather than logical judgments.<sup>7</sup> We examined how many women became more positive about vaccination after reading the leaflet. Before the leaflet presentation, the groups that would “Vaccinate immediately after a restart of the recommendation”, “Vaccinate after friends or acquaintances have been inoculated”, and “Vaccinate after many girls of her same age group have been inoculated” were lumped together into a group titled “Vaccinate after some conditions are met” (Table 1). After reading the leaflet, both the groups of “I want to get my daughter vaccinated soon” and “I will get my daughter vaccinated if certain conditions are met” became significantly more positive, responding that “I want to get vaccinated immediately” or “I am positive about vaccination”. On the other hand, the groups of “Don’t know” or “Won’t inoculate” before the explanation were still negative about the vaccination even after reading the leaflet (Table 2). From this, it can be seen that positive informational leaflets, if given by their gynecologists, are effective for people who are already somewhat positive about vaccines. In addition, it can

**Table 1.** Before being presented with the MHLW leaflet, the correlation between a mother’s intention to get her daughter vaccinated and her prior awareness of the leaflet.

Before presenting	Aware of the leaflet n (%)	No aware of the leaflet n (%)	Total	p value
Vaccination is important and I have already got my daughter vaccinated.	3 (8.3)	21 (6.3)	24 (6.4)	.717
I want to get my daughter vaccinated soon	3 (8.3)	12 (3.6)	15 (4.0)	.1684
Vaccinate if conditions are met	15 (41.7)	132 (39.3)	147 (39.5)	.8581
if the MHLW resumes the recommendation	12 (33.3)	69 (20.5)	81 (22.0)	.0894
if the acquaintance vaccinates	0 (0)	5 (1.5)	5 (1.3)	1
if many children of the same generation vaccinate	3 (8.3)	58 (17.3)	61 (16.4)	.236
I don’t know/Do not vaccinate	15 (41.7)	171 (50.9)	186 (50.0)	.3808
Total	36 (100)	336 (100)	372 (100)	

**Table 2.** After being presented with the leaflet, mother’s intention to get their daughters vaccinated.

Before presenting	After presenting			Total
	Positive	No change	Negative	
I want to get my daughter vaccinated soon	13 (86.7) **	1 (7.7)	1 (7.7)	15
Vaccine if conditions are met	88 (60.7) **	50 (34.5) *	7 (4.8) *	145
I don’t know/Do not vaccinate	52 (28.3)	94 (51.1) **	38 (20.7) **	184

be said that the effect of the presentation by the physician was that 74.1% the women felt they well understood the contents.

There is work yet to be done. For example, our survey did not follow-up to see if distributing these leaflets resulted in actual HPV vaccinations. That will be the subject of a future investigation. In addition, only 14 of our clinics and hospitals responded, so there may be a hidden bias in the patient's or physician's motivations. Details regarding the respondents, such as their social status and the reason for their visit are not clear, and may have influenced their responses relative to the general population, as evidenced by the higher rate of their daughter's vaccination status than the population of women at large.

We anticipated that if the patient's trusted gynecologist presented the MHLW leaflet, the mother's intent to get their daughter vaccinated would be increased. However, alone, this effort is not enough. It is necessary to make the content of the leaflet even more appropriate. As evidence of how a better message can work, in Ireland, as in Japan, the vaccination rate also decreased dramatically due to a spate of reports of adverse vaccine events, from 89.7% to 50%, but various Irish organizations cooperated to transmit appropriate pro-vaccine information, and the vaccination rate in Ireland has now fully recovered.<sup>10</sup> Stronger efforts, from various angles, will be necessary for re-promulgating HPV vaccinations here in Japan.

## Abbreviations

HPV	human papilloma virus
MHLW	the Ministry of Health, Labour and Welfare
FY	fiscal year

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## References

1. Yagi A, Ueda Y, Kakuda M, Tanaka Y, Ikeda S, Matsuzaki S, Kobayashi E, Morishima T, Miyashiro I, Fukui K, et al. Epidemiologic and clinical analysis of cervical cancer using data from the population-based Osaka cancer registry. *Cancer Res.* 2019;79:1252–59. doi:10.1158/0008-5472.CAN-18-3109.
2. Hall MT, Simms KT, Lew J-B, Smith MA, Brotherton JM, Saville M, Frazer IH, Canfell K. The projected timeframe until cervical cancer elimination in Australia: a modelling study. *Lancet Public Health.* 2019;4:e19–e27. doi:10.1016/S2468-2667(18)30183-X.
3. Hanley SJ, Yoshioka E, Ito Y, Kishi R. HPV vaccination crisis in Japan. *Lancet.* 2015;385:2571. doi:10.1016/S0140-6736(15)61152-7.
4. Ueda Y, Enomoto T, Sekine M, Egawa-Takata T, Morimoto A, Kimura T. Japan's failure to vaccinate girls against human papillomavirus. *Am J Obstet Gynecol.* 2015;212:405–06. doi:10.1016/j.ajog.2014.11.037.
5. Sekine M, Kudo R, Adachi S, Yamaguchi M, Ueda Y, Takata T, Morimoto A, Tanaka Y, Yagi A, Miyagi E, et al. Japanese crisis of HPV vaccination. *Int J Pathol Clin Res.* 2016;2:039. doi:10.23937/2469-5807.
6. Yagi A, Ueda Y, Egawa-Takata T, Tanaka Y, Nakae R, Morimoto A, Terai Y, Ohmichi M, Ichimura T, Sumi T, et al. Realistic fear of cervical cancer risk in Japan depending on birth year. *Hum Vaccin Immunother.* 2017;13:1700–04. doi:10.1080/21645515.2017.1292190.
7. Yagi A, Ueda Y, Kimura T. A behavioral economics approach to the failed HPV vaccination program in Japan. *Vaccine.* 2017;35:6931–33. doi:10.1016/j.vaccine.2017.10.064.
8. Japanese Ministry of Health, Labour and Welfare; [accessed 2019 Oct 1]. <https://www.mhlw.go.jp/bunya/kenkou/kekkaku-kansenshou28/index.html>.
9. Tanaka Y, Ueda Y, Egawa-Takata T, Yagi A, Yoshino K, Kimura T. Outcomes for girls without HPV vaccination in Japan. *Lancet Oncol.* 2016;17:868–69. doi:10.1016/S1470-2045(16)00147-9.
10. Corcoran B, Clarke A, Barrett T. Rapid response to HPV vaccination crisis in Ireland. *Lancet.* 2018;391:2103. doi:10.1016/S0140-6736(18)30854-7.