ABSTRACT

In Japan, the human papillomavirus (HPV) vaccination rate has decreased from around 70% to less than 1% due to repeated media reports of diverse symptoms after HPV vaccination, and to suspension of the governmental recommendation. The challenges for re-promotion of the vaccine will be discussed from a marketing perspective. The adopter categories by which a new product penetrates the market can be divided into five groups, including Innovators, Early adopters, Early majority, Late majority, and Laggards. The 16.0% line, which is the sum of the percentages of the innovators and the early adopters, is thought to be an important determinate of whether a new product will penetrate the market. By various initiatives, vaccination coverage has recently risen to about 10%; however, there is still a large chasm difficult to cross before reaching the majority of individuals. To cross that chasm, peer education will be essential. First, community health workers will need to be educated so that they have a firm understanding of HPV vaccine and can confidently recommend vaccination to the targeted population. That population will be expected to pass on that recommendation to their acquaintances, resulting in widening dissemination of HPV vaccine among the majority.

In recent years, the incidence of cervical cancer has been decreasing in developed countries; the same downward trend in incidence had been previously observed in Japan; however, it has recently reversed and has now started to increase (1). Following the successful introduction of the human papillomavirus (HPV) vaccine into Japan in the fiscal year (FY) 2009, public subsidy for vaccination of all 13–16 years old girls was started in FY2010; the nationwide vaccination rate soon reached 70% for the first dose. By April of 2013, HPV vaccination had become routine for girls ages 12 to 16. However, the media repeatedly reported the girls with diverse symptoms including chronic pain and motor impairment after vaccination. As a precaution, the Ministry of Health, Labor, and Welfare (MHLW) quickly suspended its governmental recommendation for HPV vaccine in June. The vaccination rate decreased drastically, from 70% to almost zero (2–5).

The challenges Japan face as a nation in recovering from this hiatus in HPV vaccination are immense. We have decided to approach the problem of the re-promotion of HPV vaccine into Japan from a purely marketing perspective using the concept of “Diffusion of Innovations,” which is a marketing theory, that seeks to explain how, why, and at what rate new ideas and technology spread into the marketplace (6). The theory categorizes the process by which a new service or product penetrates the market into five groups (Fig. 1A). Innovators, who actively gather information and are the first to adopt and promote new products and services, account for 2.5% of the market. Early adopters are those who adopt new products and services after judging their merits, as promoted by the innovators, and have a significant impact on the overall market penetration, accounting for 13.5% of the market. Early majority is the group that more cautiously adopts new products and services after they have penetrated the market to some extent. Late majority (34% of the market) is the category that adopts new products and services after they have penetrated the market to some extent. Laggards are the most conservative group, they are the slowest to adopt new products and services, accounting for 16% of the market.

The diffusion of innovations theory emphasizes the importance of the 16.0% line, which is the sum of the percentages of Innovators and Early adopters, in determining whether a new product introduced to the market will penetrate. The theory says that when the penetration rate reaches 16.0%, the product will boom and the demand will accelerate rapidly. On the other hand, according to the “Chasm Theory,” there is a large chasm between the early market, consisting of Innovators and Early adopters, and the mainstream market, which consists of Early majority and Late majority, that cannot be easily crossed (7). For example, a Japanese company developing a free market application "Mercari" succeeded in raising awareness by adopting a large-scale commercial strategy at a time when the app’s popularity was stagnant, approaching a chasm (https://forbes japan.com/articles/detail/23652; in Japanese).

The widespread cessation and future re-promotion of HPV vaccine will be discussed from the perspectives of the diffusion of Innovations and Chasm theories. During the period when HPV vaccine had been well received under the widely accepted
Innovation penetrates the early market, which consists of innovations theory, demand is thought to accelerate rapidly to the mainstream market, which consists of the initial majority and late majority, when the adoption of a new product or service (i.e., “innovation”) does not happen simultaneously in a social system. The criterion for adopter categorization is innovativeness. There are five established adopter categories, and the majority of the general population tends to fall in the middle categories. According to the diffusion of innovations theory, demand is thought to be going to accelerate rapidly to the mainstream market, which consists of the initial majority and late majority, when the innovation penetrates the early market, which consists of Innovators and Early adopters. However, according to the Chasm theory, there is a huge chasm at the penetration rate of 16% between the initial market and the mainstream market that cannot be easily crossed. B, High coverage of the HPV vaccine in the period of FY2010–2012. The HPV vaccination rate was 55.5%, 73.5%, 78.2%, 78.8%, and 68.9% in the girls born in FY1994–1999 during the period of public subsidies for HPV vaccine—before the governmental recommendation was suspended, which meant HPV vaccine was disseminated not only to innovator and early adopters but also to the early and late majorities. C, Preconditions mothers would require before recommending HPV vaccination, in the FY2013 period of suspension of the governmental recommendation. The preconditions that mothers would require before promoting or allowing their daughters’ HPV vaccination might potentially associate with the innovativeness of the mothers. D, HPV vaccination coverage has slightly recovered, future challenges remain. Because of several measures, the HPV vaccination rate in Japan has improved to around 10%. For the vaccination rate to cross the 16% market chasm, awareness of the importance of the HPV vaccine needs to spread to the majority of the target population and their guardians. Education of community health workers, including public health nurses, will lead to their firm understanding of the importance of the HPV vaccine and their confident recommendation of HPV vaccination to the target population and their guardians, who are them expected to recommend the HPV vaccine to their friends by so-called peer education.

Figure 1.
Marketplace principles and re-promoting HPV vaccine. A, Diffusion of Innovations and Chasm theories. The process of market diffusion of a new product or service. Adoption of a new product or service (i.e., “innovation”) does not happen simultaneously in a social system. The criterion for adopter categorization is innovativeness. B, High coverage of the HPV vaccine in the period of FY2010–2012. The HPV vaccination rate was 55.5%, 73.5%, 78.2%, 78.8%, and 68.9% in the girls born in FY1994–1999 during the period of public subsidies for HPV vaccine—before the governmental recommendation was suspended, which meant HPV vaccine was disseminated not only to innovator and early adopters but also to the early and late majorities. C, Preconditions mothers would require before recommending HPV vaccination, in the FY2013 period of suspension of the governmental recommendation. The preconditions that mothers would require before promoting or allowing their daughters’ HPV vaccination might potentially associate with the innovativeness of the mothers. D, HPV vaccination coverage has slightly recovered, future challenges remain. Because of several measures, the HPV vaccination rate in Japan has improved to around 10%. For the vaccination rate to cross the 16% market chasm, awareness of the importance of the HPV vaccine needs to spread to the majority of the target population and their guardians. Education of community health workers, including public health nurses, will lead to their firm understanding of the importance of the HPV vaccine and their confident recommendation of HPV vaccination to the target population and their guardians, who are them expected to recommend the HPV vaccine to their friends by so-called peer education.

Public subsidies in FY2010–2012, the chasm that existed between Early adopters and Early majority was easily overcome (Fig. 1B). However, after the reports of diverse symptoms after HPV vaccination and then the suspension of the governmental recommendation for HPV vaccine FY2013, HPV vaccination decreased to the point where less than 1% of eligible girls were accepting the vaccine.

For this discussion, those few girls who received the HPV vaccine and their guardians who promoted it to them under that unique situation, could be regarded as Innovators who value newness and innovation. In general, Innovators are followed by Early adopters, but in this case, Early adopters could not follow Innovators because, due to concerns about the vaccine’s safety, despite HPV vaccine became free of charge since FY2013. Almost no one else was getting vaccinated in Japan. In the era of HPV vaccine suspension, there was thus a large and unusual chasm between Innovators and Early adopters that could not be crossed.

We previously conducted an Internet survey, in May 2015, of 2,060 mothers of the girls eligible for HPV vaccine to ask them what preconditions they would impose on their daughters’ HPV vaccination under the suspension of the governmental recommendation of HPV vaccine (8). The percentage of respondents who answered, “No preconditions” was 0.2%, and that was very close to the vaccination rate at that time; that is, these were the rare Innovators (Fig. 1C). Those who responded
"When the governmental recommendation is resumed" was 3.9%, which potentially corresponded to Early adopters. Those who said, "If her acquaintances get vaccinated" and "If many of her same generation gets vaccinated" were 16.9% and 50.7%, which would correspond to the category of Early majority and Late majority, respectively. Those who said, "I would not get my daughter vaccinated," was 28.2%, which was the slowest to adopt new products and services, and was considered to be Laggards. In this online survey, there was no difference by the respondents’ region of residence.

More than 7 years have now passed since the governmental recommendation was suspended in Japan. During this time, more than sufficient evidence for the safety and efficacy of HPV vaccine has been demonstrated (9–12). The news media has even begun to focus on the negative effects of the continuing suspension. Acceptance—the intention to receive the HPV vaccine—has improved significantly, from 6.7% to 11.5%, in our most recent Internet survey conducted in November 2019 (13). For the resumption of the governmental recommendation of HPV vaccine, academic societies have repeatedly issued the statements (14) and the National Diet members have also formed a parliamentary group.

The MHLW has also drastically revised its HPV informational pamphlet, which at one time focused on the possible symptoms after getting an HPV vaccination. In the municipalities where the vaccine leaflets were sent individually to the age-targeted girls, the vaccination rate recovered to about 10% (15). In addition, in an Internet survey, we found that the intention to vaccinate increased to 9.2% when the contents of the leaflet were changed to be more positive, irrespective of the respondents’ region of residence (13).

As a result of these initiatives, HPV vaccination coverage and intentions have improved, in other words, the HPV vaccine has penetrated the "market" represented by age-eligible girls and their guardians, herein categorized as Early adopters, who joined the category of innovators who had already been vaccinated (Fig. 1D). However, as Moore has said, “There is something fundamentally different between a sale to an Early adopter and a sale to Early majority” (7). There is still the next large chasm, the one between Early adopters and Early majority that will be difficult to overcome.

How can we re-promote the HPV vaccine beyond the chasm between Early adopters and Early majority? Of course, resumption of the governmental recommendation is essential. In reality, the safety and efficacy of the HPV vaccine have been widely demonstrated and positive leaflets of HPV vaccine had started to be sent to each target population. Nevertheless, the vaccination rate remains stuck at around 10%. According to our previous Internet survey, only about an additional 3.9% of the respondents were going to be vaccinated—if the governmental recommendation was resumed (8).

Strategies based on marketing theory have been used to improve health care. Cancer screening rates were demonstrated to be improved by effective recommendation messages base on behavioral economics (16). We conducted a behavioral economics approach to the failed HPV vaccination program in Japan (8, 17). Appealing of increasing incidence and seriousness of cervical cancer was found to increase mothers’ intention to get their daughters inoculated. However, mothers’ intention to inoculate their daughters could not be increased sufficiently due to the significant impact of repeated media reports of girls with diverse symptoms after HPV vaccination. The HPV vaccine issue in Japan is no longer at a stage where resumption of the governmental recommendation one effective message based on behavioral economics or health care marketing and can raise vaccination rates.

To spread the vaccine to those of Early majority and Late majority categories, it is necessary to help the targeted girls and their guardians to become aware that HPV vaccine has already been given to thousands and millions of other girls in Japan. To achieve this, it is important that the HPV vaccine be discussed among those who are eligible for vaccination. It is especially critical that those who have already been vaccinated tell others about the vaccine and the important benefits. To this end, it is essential that community health workers, including public health nurses, are educated so that they have a firm understanding of the importance of HPV vaccine and can confidently and convincingly recommend vaccination to the target population and their guardians. The vaccinated girls and their guardians are expected, in the same way, to have a relatively firm understanding of the importance of HPV vaccine and confidently recommend vaccination to their friends and acquaintances, resulting in re-dissemination of HPV vaccine among Early to Late majority. This strategy would suggest that the innovator model can be utilized to help cross the chasm by rapidly increasing the number of girls who make a decision to get vaccinated as a result of so-called peer education or peer promotion. Previously, we demonstrated the success of intervention with mothers by sending them a cervical cancer information leaflet with a request that they recommend that their daughter receive cervical cancer screening, which significantly improved their daughters’ screening rate (18, 19). Peer education among non-health professionals is a potential tool that triggers expansive market penetration. Positive media reports on HPV vaccine will potentially enhance the effectiveness of this strategy to penetrate HPV vaccine.

Doctors also need to provide appropriate explanations to the girls and their mothers. In a questionnaire survey conducted at obstetrics and gynecology clinics, among the female patients who were given sufficient explanations from their doctors regarding cervical cancer and HPV vaccine, 6.7% said that they would have their daughters vaccinated immediately, and 37.8% said that they felt more positive about vaccinating their daughters (20). Another study we conducted in 2020 showed that 7 (30%) of 21 mothers who became more willing to inoculate their daughters after appropriate explanation about HPV vaccine from a doctor in an obstetrics and gynecology
clinic returned to the clinic immediately to get their daughters vaccinated (21). We believe that the family doctor has a major influence on vaccination decisions. Because the attitudes of Japanese obstetricians and gynecologists regarding the HPV vaccine have recently been found to be improving (22), they are expected to provide more positive explanation to the targeted girls and their mothers.

It has long been thought that the only way to re-promote HPV vaccine in Japan for the MHLW to resume its recommendation and the doctors and public health nurses would have to give the appropriate explanations to the target population and their guardians to address their fear of cervical cancer and the importance of HPV vaccine, and educate them how to tell their acquaintances about it. We sincerely hope that HPV vaccine will penetrate the category of Early and one as soon as possible.

References


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The Chasm We Must Cross in Japan for Re-promotion of the HPV Vaccine

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