

Underlying background of the current trend of increasing HPV vaccination coverage in Japan

Mira Namba^{1,5}, Yudai Kaneda^{2,5,*}, Chiharu Kawasaki³, Rajeev Shrestha⁴, Tetsuya Tanimoto⁵

¹ School of Medicine, Keio University, Tokyo, Japan;

² School of Medicine, Hokkaido University, Hokkaido, Japan;

³ School of Medicine, Teikyo University, Tokyo, Japan;

⁴ Palliative care and Chronic disease, Green Pasture Hospital, Pokhara, Nepal;

⁵ Department of Internal Medicine, Jyoban Hospital of Tokiwa Foundation, Fukushima, Japan.

Abstract: Cervical cancer is prevalent among women, with a reported 604,127 cases in 2020 worldwide. The incidence of cervical cancer has been mitigated in most high-income countries by promoting the human papilloma virus (HPV) vaccine. However, in Japan, cervical cancer is still a leading cause of mortality and the most prevalent cancer among women aged between 15 and 39. This can be attributed to the 7-year suspension of HPV vaccination recommendations by the Japanese government. A decline in vaccination coverage followed this suspension, caused by a small number of reported adverse events, resulting in a steep decline in vaccination coverage from over 70% to less than 1%. However, there have been indications of a change in trend in Japan. In 2020, a group of volunteer doctors initiated awareness-raising activities through social networking services and other platforms, and the target population that received at least one dose of the vaccine in 2020 increased to 15.9%. Additionally, in July 2020, the Japanese government approved the updated 9-valent HPV vaccine and resumed recommendations in November 2021. As a result, 30.1% of those eligible for routine HPV vaccination received at least one dose of the vaccine from April to September, 2022. However, the HPV vaccine coverage in Japan is still far from the 90% recommended by the World Health Organization, and continued communication and education on the vaccine's benefits are necessary to achieve optimal coverage.

Keywords: HPV vaccine, vaccination coverage, cervical cancer, Japan

Cervical cancer is the fourth most common cancer in women, with an estimated 604,127 reported cases in 2020 worldwide (1). Still, the incidence has been mitigated in most high-income countries through the promotion of the human papilloma virus (HPV) vaccine (2). Unfortunately, this is not the case in Japan, where cervical cancer is still the second leading cause of mortality and the most prevalent form of cancer among women aged between 15 and 39 (3).

The dire situation can be partly attributed to the 7-year-long suspension of proactive recommendations for HPV vaccination by the Japanese government. Despite the implementation of a government-subsidized HPV vaccination program in 2010 and its establishment as a routine, a publicly-funded vaccine for girls aged 12 to 16 years since April 2013, the immediate suspension of public recommendations since June 2013 due to a small number of reported adverse events resulted in a steep decline in vaccination coverage, which plummeted from over 70% to less than 1% in a birth fiscal year cohort and persisted for nearly seven years (4). However, as Figure

1, which shows the trend of HPV vaccination coverage among the target population in Japan using publicly available data from the Ministry of Health, Labor and Welfare website (5), suggests, there are indications that this trend is reversing in Japan.

In 2020, a volunteer group of doctors initiated awareness-raising activities on the issue through social networking services and other platforms such as Twitter (6), leveraging accumulated domestic scientific evidence that had been amassed over the preceding seven years, which revealed there was no association between HPV vaccine and reported post-vaccination symptoms (7). In the case of vaccination against coronavirus disease 2019 (COVID-19), such activities were reported to have reduced Japanese university students' vaccine hesitancy (8), and similar results were likely achieved with regard to HPV vaccination. Indeed, the target population that received at least one dose of the vaccine in the fiscal year 2020 increased to 15.9% from 3.3% in the previous year.

Subsequently, the Japanese government changed its policy; it approved the updated 9-valent HPV vaccine in

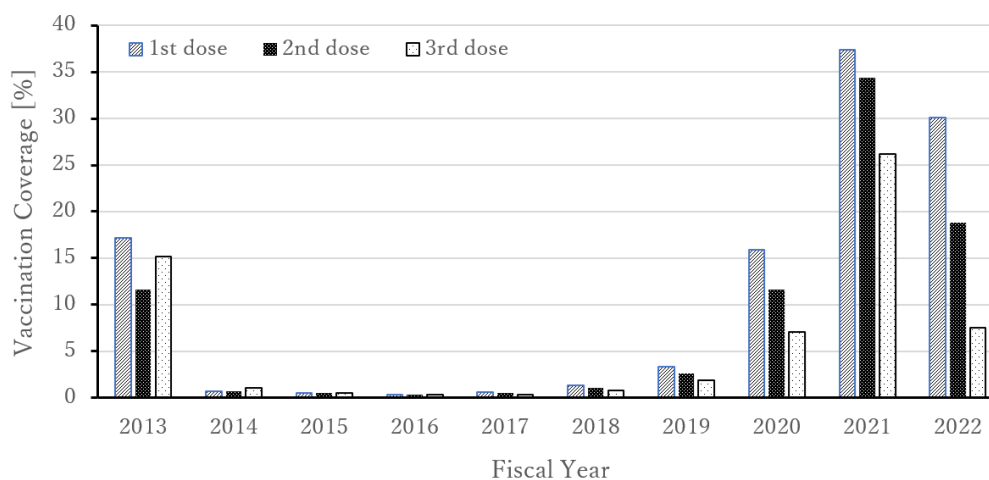


Figure 1. Trends of the human papilloma virus (HPV) vaccine coverage among the target population in Japan. (Note: As for 2022, only data from April to September was publicly available.)

July 2020 and resumed recommendations in November 2021. In line with a previous analysis concerning changes in policy defaults that contributed to significant changes in people's behavior (9), 30.1% of those eligible for routine HPV vaccination had received at least one vaccination from April 2022, when local governments resumed distribution, to September of the same year. According to government statistics, this is almost double compared to 15.9% in the fiscal year 2020.

Although Japan's HPV vaccine hesitancy is still conspicuous compared to other countries worldwide, the multiplier efforts have supported a recovery trend in the coverage. Also, the increase in COVID-19 vaccination coverage may have contributed to lessening vaccine hesitancy (10), resulting in more HPV vaccine coverage among the population. However, the coverage is still far from the sufficient level of 90%, which the World Health Organization has recommended, and continued communication and education about the long-term preventive benefits of the HPV vaccine is essential to achieve optimal coverage.

Funding: None.

Conflict of Interest: Dr. Tanimoto reported personal fees from Medical Network Systems Inc. and Bionics co. Ltd., outside the submitted work. No other disclosures were reported.

References

- Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J Clin.* 2021; 71:209-249.
- Canfell K. Towards the global elimination of cervical cancer. *Papillomavirus Res.* 2019; 8:100170.
- Yuri Ito. Uterine Cancer. *JACR Monograph: Supplement No.2.* http://www.jacr.info/publication/Pub/m_supp_02/

- m_supp2_9.pdf* (accessed February 13, 2023). (in Japanese)
- Kunitoki K, Funato M, Mitsunami M, Kinoshita T, Reich MR. Access to HPV vaccination in Japan: Increasing social trust to regain vaccine confidence. *Vaccine.* 2021; 39:6104-6110.
- Ministry of Health, Labor and Welfare. Human papillomavirus infection - cervical cancer and HPV vaccine. <https://www.mhlw.go.jp/bunya/kenkou/kekkaku-kansenshou28/index.html> (accessed May 17, 2023). (in Japanese)
- Imanishi Y, Kinoshita T, Sakamoto M, Ichimiya M, Mitsunami M, Takahashi T, Shigemi D, Song M, Inaba K. Importance of human papillomavirus vaccination leaflets focusing on the safety profile targeted pediatricians in Japan. *Vaccine.* 2022; 40:5010-5015.
- Suzuki S, Hosono A. No association between HPV vaccine and reported post-vaccination symptoms in Japanese young women: Results of the Nagoya study. *Papillomavirus Res.* 2018; 5:96-103.
- Sakamoto M, Ishizuka R, Ozawa C, Fukuda Y. Health information and COVID-19 vaccination: Beliefs and attitudes among Japanese university students. *PLoS One.* 2022; 17:e0277435.
- Mertens S, Herberz M, Hahnel UJJ, Brosch T. The effectiveness of nudging: A meta-analysis of choice architecture interventions across behavioral domains. *Proc Natl Acad Sci U S A.* 2022; 119:e2107346118.
- Trujillo KL, Green J, Safarpour A, Lazer D, Lin J, Motta M. Covid-19 spillover effects onto general vaccine attitudes. <https://osf.io/w7mq5/> (accessed May 17, 2023).

Received February 13, 2023; Revised May 17, 2023; Accepted May 23, 2023.

Released online in J-STAGE as advance publication May 25, 2023.

§These authors contributed equally to this work.

**Address correspondence to:*

Yudai Kaneda, School of Medicine, Hokkaido University, Kita-ku, Kita 15, Nishi 7, Sapporo, Hokkaido 0608638, Japan.

E-mail: nature271828@gmail.com