

Japan alone is going backwards in time

D. Tanaka^{1*}, Y. Ueda¹, A. Yagi^{1*}, S. Nakagawa¹, T. Takiuchi¹, E. Miyagi², T. Enomoto³, T. Kimura¹

¹Department of Obstetrics and Gynecology, Osaka University Graduate School of Medicine, Suita, Osaka

²Department of Obstetrics, Gynecology and Molecular Reproductive Science, Yokohama City University Graduate School of Medicine, Kanazawa-ku, Yokohama, Kanagawa

³Department of Obstetrics and Gynecology, Niigata University Graduate School of Medical and Dental Sciences, Niigata (Japan)

Summary

Background: In Japan, the Ministry of Health, Labour, and Welfare decided to temporarily suspend recommendation of HPV vaccination in June, 2013. As a result, disparities in HPV vaccination rates have occurred, depending on an unfortunate year of birth, leading to predicted disparities in HPV infection rate at the age of 20. **Materials and Methods:** In this study, we estimated the cervical cancer incidence as a ratio of lifetime HPV infection risk. We assumed that “the frequency of cervical cancer occurrence throughout the lifetime of young females who did not have opportunities (born in 1993) to be vaccinated could be defined as 1”. The lifetime risk of cervical cancer was assumed to correlate with the risk of HPV infection throughout a lifetime, which was assumed to correlate with the rate of experiencing sexual intercourse before HPV vaccination. **Results:** If recommendation for the vaccine does not restart until 2020, then the females born between 2000 and 2003 will likely remain unvaccinated, as they will be above the age for government-paid vaccination by the time vaccination restarts. If the vaccination restarts in 2020 and the cumulative vaccinated rate after resuming vaccination encouragement in girls is 70%, the estimated risk of cervical cancer among girls (born in 2008 or later) will decrease to 0.58. Supposing that HPV vaccination for girls aged 12-16 during encouraged suspension, in addition to female children aged 12-16 at the time of encouraged resumption that restarts in 2020, the risk of cervical cancer among females who were born in 2000-2003 will be lower than the scenario of HPV vaccination only for young females aged 12-16 that restarts in 2020. **Conclusions:** This cohort of young women, if a significant intervention is not begun soon, will present an increase in regards to the future onset of cervical cancers. We must all be aware that Japan alone is going backwards in time.

Key words: HPV vaccine; Suspension of governmental recommendation; Cervical cancer risk; Birth year; Prediction.

Introduction

HPV vaccinations became available to girls with public aid from 2010, and indeed by 2012, a vaccination rate of roughly 70% had been achieved in Japan [1, 2]. However, in March 2013, the media repeatedly reported potential adverse events [3, 4]. After Joint meeting of the Vaccine Adverse Reactions Review Committee, the Ministry of Health, Labour, and Welfare decided to temporarily suspend recommendation of HPV vaccination in June, 2013 [1-4]. As a result, disparities in HPV infection rate at the age of 20 will have occurred, depending on an unfortunate year of birth [5]. In this study, we estimated the cervical cancer incidence as a ratio of lifetime HPV infection risk.

Materials and Methods

We have defined the frequency of cervical cancer occurrence, throughout the lifetime of young females. Tables were created assuming that “the frequency of cervical cancer occurrence throughout the lifetime of young females who did not have opportunities (born in 1993) to be vaccinated could be defined as 1”, “the risk of HPV infection throughout a lifetime correlates with the risk of cervical

cancer throughout that lifetime”, “the risk of HPV infection correlates the rate of experiencing sexual intercourse before HPV vaccination”, “HPV 16 and 18 cause 60% of cervical cancers in Japan [6]”, “multiple infections with other HPV genotypes do not occur”, “the number of patients suffering from HPV-related cervical cancer (except HPV 16 and 18) will remain stable, even if vaccination encouragement is resumed”, “the number of patients with cervical cancer will remain stable, unless more young females are vaccinated”, “the rate of experiencing sexual intercourse at the age of 20, 19, 18, 17, 16, 15, 14, 13, and 12 was assumed to be 65%, 55%, 42%, 25%, 15%, 5%, 2%, 1% and 0%, respectively”, “the rate of experiencing sexual intercourse throughout a lifetime was assumed to be 85%”, “from 2010, HPV vaccinations became available with public aid to female children aged 13 to 16, and, from April 2013, subsequently became routine vaccinations for those aged 12-16”, “female children were vaccinated at the youngest age during the encouragement period (except 2013) and antibody titers are sufficiently sustained throughout a lifetime”, “in 2013, the cumulative rate of vaccination among female children aged 12 and 13 was 1% [unpublished data] and 4% [2], respectively”, and “the re-

*Contributed equally.

Table 1. — *Estimated relative risk of cervical cancer throughout a lifetime.*

	A	B	C	D	E	F
1993	1	1	1	1	1	1
1994	0.6541	0.6541	0.6541	0.6541	0.6541	0.6541
1995	0.6047	0.6047	0.6047	0.6047	0.6047	0.6047
1996	0.5899	0.5899	0.5899	0.5899	0.5899	0.5899
1997	0.5899	0.5899	0.5899	0.5899	0.5899	0.5899
1998	0.5899	0.5899	0.5899	0.5899	0.5899	0.5899
1999	0.5899	0.5899	0.5899	0.5899	0.5899	0.5899
2000	0.9763	0.9763	0.9763	0.9396	0.8831	0.8247
2001	0.994	0.994	0.994	0.9396	0.8479	0.7718
2002	1	1	1	0.9089	0.7875	0.6813
2003	1	1	1	0.8729	0.7035	0.5553
2004	1	0.8518	0.6541	0.8518	0.6541	0.4812
2005	1	0.8306	0.6047	0.8306	0.6047	0.4071
2006	1	0.8242	0.5899	0.8242	0.5899	0.3848
2007	1	0.8221	0.5849	0.8221	0.5849	0.3774
2008	1	0.82	0.58	0.82	0.58	0.37

Scenario A: Current status; Scenario B: HPV vaccination for young females age 12-16 restarts in 2020 and the vaccination rate is 30%.

Scenario C: HPV vaccination for young females age 12-16 restarts in 2020 and the vaccination rate is 70%.

Scenario D: HPV vaccination for female children aged 12-16 during encouragement suspension in addition to female children aged 12-16 at the time of vaccination encouragement resumption restarts in 2020 and the vaccination rate is 30%.

Scenario E: HPV vaccination for female children aged 12-16 during encouragement suspension in addition to female children aged 12-16 at the time of vaccination encouragement resumption restarts in 2020 and the vaccination rate is 70%.

Scenario F: Nine-valent HPV vaccination for female children aged 12-16 during encouragement suspension in addition to female children aged 12-16 at the time of vaccination encouragement resumption restarts in 2020 and the vaccination rate is 70%.

relationship between vaccination rate and experience of sexual intercourse is independent”.

Results

Though this is a rough prediction study, Table 1 shows disparities in the estimated risk of HPV-related cervical cancer throughout a lifetime that have occurred, depending on the year of birth. If the vaccination restarts in 2020 and the cumulative vaccinated rate after resuming vaccination encouragement in girls is 70%, the estimated risk of cervical cancer among girls (born in 2008 or later) will decrease to 0.58 (scenario C). Supposing that HPV vaccination for girls aged 12-16 during encouraged suspension, in addition to female children aged 12-16 at the time of encouraged resumption restarts in 2020 (scenarios D and E), the risk of cervical cancer among females who were born in 2000-2003 will be lower than that of scenarios B and C (HPV vaccination only for young females age 12-16 restarts in 2020.) Supposing that the nine-valent HPV vaccination for girls aged 12-16 during encouraged suspension, in addition to female children aged 12-16 at the time of encouraged resumption restarts in 2020 (scenario F), the relative risk of cervical cancer among females who were born in 2000-2003 will be lower than that of scenarios D and E.

Conclusion

If recommendation for the vaccine does not restart until 2020, then the females born between 2000 and 2003 will likely in the future remain unvaccinated, as they will be above the age for government-paid vaccination by the time vaccination restarts. This cohort of young women, if a significant intervention is not begun soon, will present an increase in regards to the future onset of cervical cancers. We must all be aware that Japan alone is going backwards in time.

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Corresponding Author:

Y. UEDA, M.D., PHD

Department of Obstetrics and Gynecology

Osaka University Graduate School of Medicine

2-2 Yamadaoka, Suita, Osaka 565-0871 (Japan)

e-mail: ZVF03563@nifty.ne.jp