Dramatic Reversal of Public Opinion and More Dramatic Change of the Attitude of Experts:

A Case Study of a Discourse on HPV in Japanese Twitter

social media, public opinion, anti-vaxxers, role of experts, HPV

Introduction and Main Focus

In June 2013, the Japanese government suspended proactive recommendations for the HPV (human papillomavirus) vaccine as public concerns about the stability of vaccines increased. It was two months after proactive recommendations began in April 2013. Rates of HPV vaccination in Japan, which were around 70% before the suspension, dropped to 0.6% after the suspension (Hanley and Yoshioka, 2015).

As a background to the growing power of anti-vaccine opponents in the early days, many Japanese medical and scientific officials point out the lack of enlightenment of knowledge about the HPV vaccine and inflammatory reports of the mass media. However, medical sociologists, STS researchers, and researchers specializing in risk communication cite the public's distrust in Japan's medical administration compensation as the background to the movement against vaccines. The significance of this study is to analyze what kind of communication has occurred by what kind of entity between the introduction and suspension of 2013 and the decision to resume in 2021. Considering many factors across many areas, we will analyze the changes in the tone of this discussion on Twitter, and through the examination, we will try to clarify the changes in public opinion regarding vaccines and their factors.

Results

We tried to calculate the ratio of the pro-vaccine group and the anti-vaccine group, and we examined the trend of change. Until 2014, the anti-vaccine group was the mainstream, but from 2015 to 2017, the pro-vaccine group steadily increased, and from 2018, on the contrary, it can be seen that the pro-vaccine group has stably occupied the majority. Based on this, we divided public opinion on Twitter into three periods: The ‘Early period’ (2011~2014), when anti-vaccine was the mainstream, the ‘Transition period’ (2015~2017), when the movement of the Internet media and a small number of doctors started to move public opinion on Twitter, and the ‘Latter period’, where the pro-vaccine group became the majority. The results of this study show that the structure of public opinion has been remarkably changed before and after the transition period. More specifically, the changes in public opinion that can be inferred from the results of this study are as follows.

Discussion

Why did this shift in public opinion occur? First, authority may have influenced changes in public opinion. It is often said that the Japanese are 'weak to external pressure'(Miyashita, 1999). Moreover, as mentioned earlier, the “proselytes” who changed their attitude from opposing to in favor frequently quoted foreign media such as the Guardian and Washington Post, which can also be understood in terms of the operation of authority. The news that a Japanese scientist in favor of the HPV vaccine won the John Maddox Prize awarded by a prestigious academic journal in December 2017 also seems to have had an impact. The second thing to notice is that medical experts who started to move after being silent. One of the facts that solid evidence was obtained in this study is that 'the experts were silent in the beginning.' As internet media Wedge and BuzzFeed wrote articles, and a Japanese doctor Muranaka won the John Maddox Prize, more experts joined the discussion. In particular, many of the users included in the top 10

retweet rankings, which can be seen as having a lot of influence, were doctors. Perhaps doctors who read Muranaka's columns in Wedge came up with their opinions, thinking 'I also kept thinking (anti-vaccine theory) was weird!' In other words, it is possible that the bandwagon effect among doctors triggered a change in public opinion on Twitter.

It is demanding to explain certain social changes after the fact. However, based on the above review, the findings of this study support the following scenario for a dramatic change in public opinion on Twitter. First of all, in the beginning, there were many users in the Twitter space who were skeptical about the HPV vaccine. The government and media hoped that the HPV vaccine could prevent cervical cancer. Since then, they have consistently kept their distance from skepticism about vaccines, despite the weakening of the pro-vaccine group due to allegations of side effects. The majority of administrators and doctors who wanted to avoid mud-sliding remained silent. However, change began when journalists as activists and doctors, regardless of their ideology, began to criticize the situation using authority. The pro-vaccine group and the anti-vaccine group criticized each other fiercely. But more importantly, the number of actors led by doctors has increased rapidly. Each of the doctors who belatedly participated in the discussion tried to communicate with Twitter users. As a result, the balance of attitudes toward vaccines appears to have been reversed and stabilized.

Methods

To understand how the discussion about HPV has changed, we collected and analyzed Twitter, one of the most popular social media in Japan. We selected Japanese terms ‘HPV ワクチン’, ‘子宮頸がんワクチン’, ‘子宮頸癌ワクチン’ and ‘子宮頸ガンワクチン’, which are Japanese terms for HPV vaccines, as keywords for collection. As a result of collecting using the Twitter API (version 10.0), a total of 3.97 million Tweets created between 2011 and 2021 were collected. We used the Twitter API as of 2021 to collect historical data up to 2011. It is therefore worth noting that this data set does not include tweets that were deleted prior to the time of collection, or tweets from accounts that were deactivated or suspended at the time of collection.

References

Hanley, S.; Yoshioka, E.; Ito, Y.; and Kishi, R. 2015. HPV vaccination crisis in japan. *The Lancet* 385(9987): 2571. doi:10.1016/S0140-6736(15)61152-7

Kunitoki, K.; Funato, M.; Mitsunami, M.; Kinoshita, T.; and Reich, M. R. 2021. Access to HPV vaccination in japan: Increasing social trust to regain vaccine confidence. *Vaccine* 39(41): 6104-6110.

Larson, H. J.; Wilson, R.; Hanley, S.; Parys, A.; and Paterson, P. (2014). Tracking the global spread of vaccine sentiments: The global response to Japan's suspension of its HPV vaccine recommendation. *Human Vaccines & Immunotherapeutics* 10(9): 2543-2550.

Miyashita, A. 1999. Gaiatsu and japan's foreign aid: Rethinking the reactive-proactive debate. *International Studies Quarterly* 43(4): 695-731. Retrieved from http://www.jstor.org/stable/3014027

Simms, K. T.; Hanley, S. J.; Smith, M. A.; Keane, A.; & Canfell, K. 2020. Impact of HPV vaccine hesitancy on cervical cancer in japan: A modelling study. *The Lancet Public Health* 5(4): e223-e234.

Suzuki, S., and Hosono, A. 2018. No association between HPV vaccine and reported post-vaccination symptoms in Japanese young women: Results of the nagoya study. *Papillomavirus Research* 5: 96-103.

Tsuda, K.; Yamamoto, K.; Leppold, C.; Tanimoto, T.; Kusumi, E.; Komatsu, T.; et al. 2016. Trends of media coverage on human papillomavirus vaccination in Japanese newspapers. *Clinical Infectious Diseases* 63(12): 1634-1638.

World Health Organization. 2015. World Health Organization. Global Advisory Committee on Vaccine Safety, Statement on Safety of HPV Vaccines: 17 December 2015.

World Health Organization. 2017. Weekly Epidemiological Record, *Weekly Epidemiological Record= Relevé épidémiologique hebdomadaire* 92(28): 393-404.

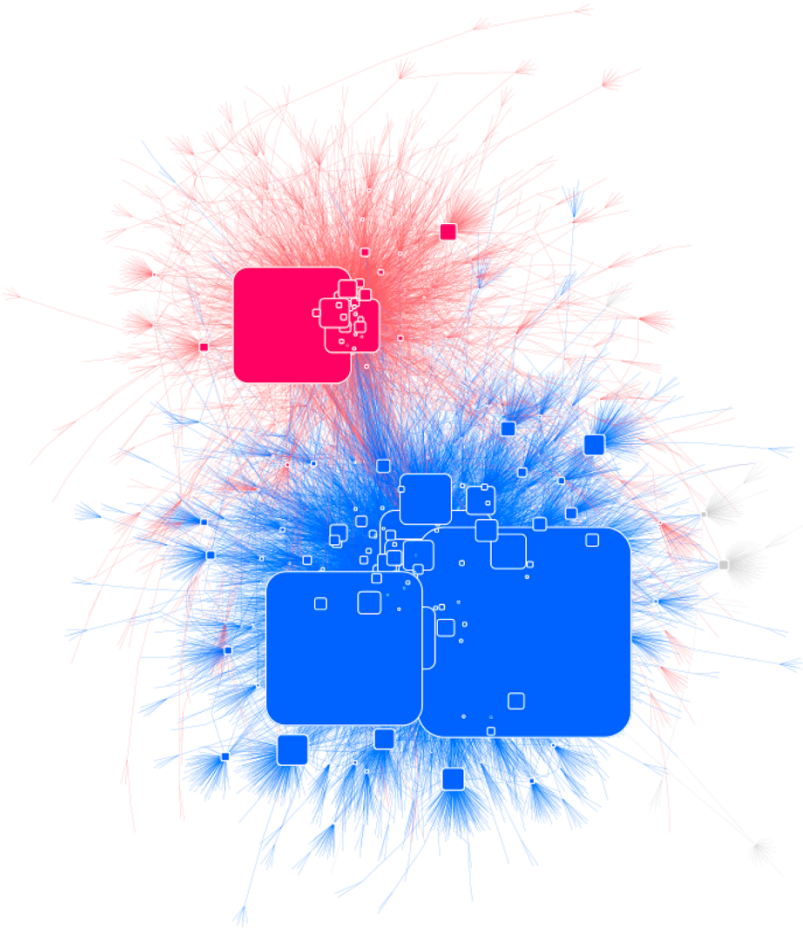

Figure 1. Retweet network of HPV-related Tweets

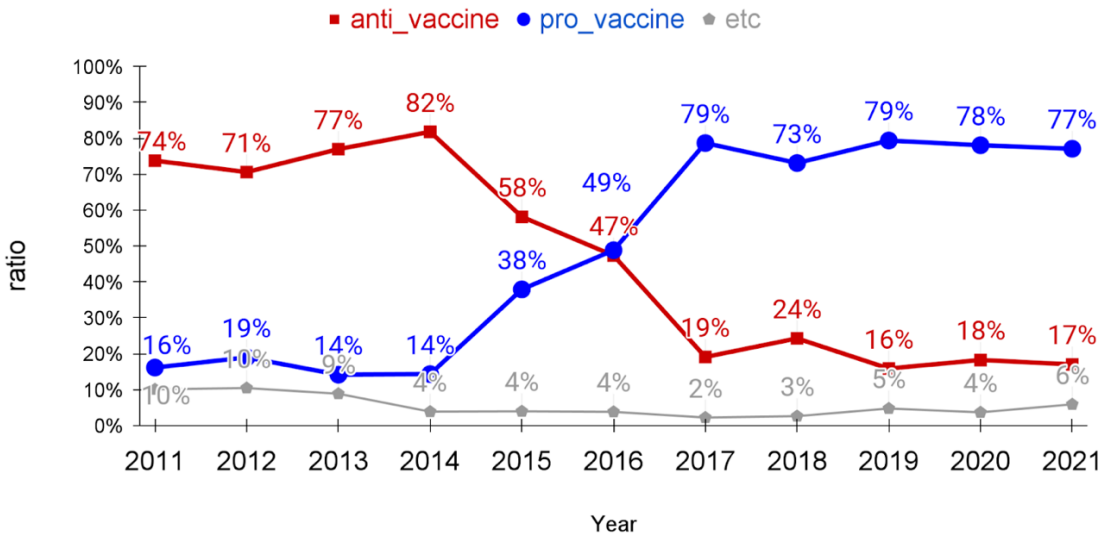

Figure 2. Changes in the ratio of the pro-vaccine group and the anti-vaccine group

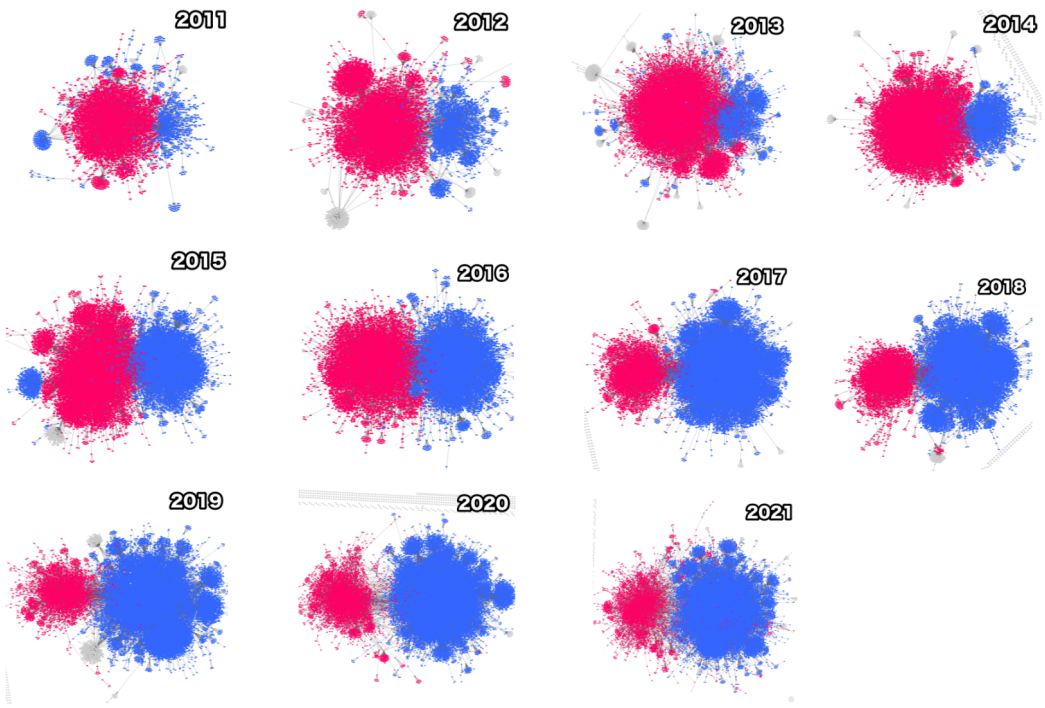

Figure 3. Changes in the retweet Network from 2011 to 2021 (blue for the pro-vaccine group, red for the anti-vaccine group)

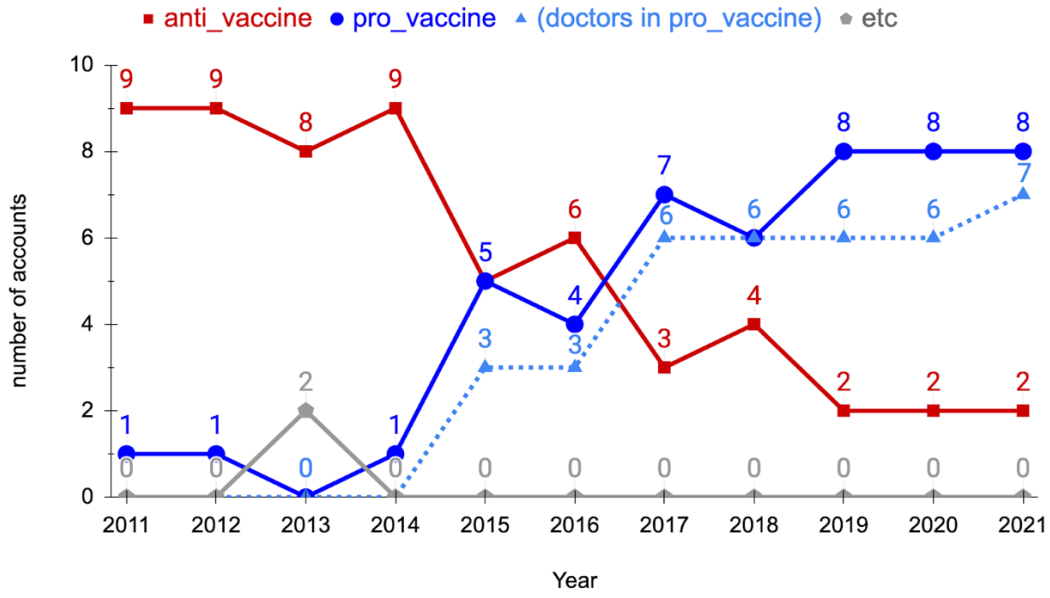

Figure 4. Changes in the ratio of the pro-vaccine and anti-vaccine group among top 10 most retweeted users