

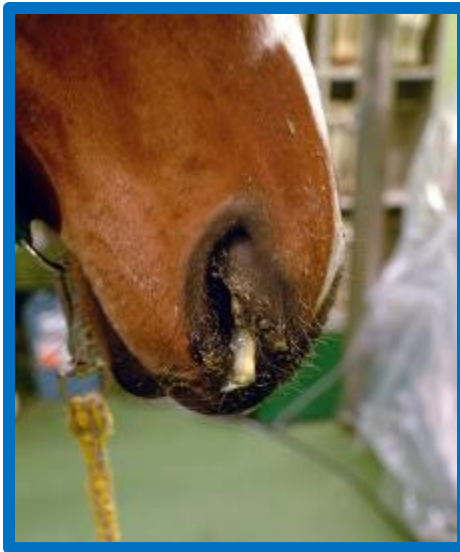
**Vaccines and recommended
vaccination schedules
to prevent equine influenza (EI)**

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Equine influenza (EI)

- Equine influenza virus (EIV): Influenza A virus, H3N8
- Respiratory diseases: fever, cough, nasal discharge
- Significant economic losses to the horse industry
- Vaccination is an important measure to control EI



Representative examples of commercially available vaccine technologies

Vaccine type	Feature	Product
Whole inactivated	Inactivated viruses	Duvaxyn (Elanco)
Subunit vaccine	Only antigenic fragments (HA/NA)	Equip F (Pfizer)
Live-attenuated	Attenuated, cold-adapted virus	Flu Avert (Merck)
Canary pox vectored	Vector with HA gene	PROTEQ FLU (Boehringer)

(Paillot, Vaccines 2014; Oladunni et al., Viruses 2021)

WOAH Expert Surveillance Panel on Equine Influenza Vaccine Composition

- The panel started about 30 years ago
- To avoid vaccine breakdown, the meeting reviews annually the epidemiological and virological information
- The panel recommends proper vaccine strains every year

(WOAH bulletin, 2017)



WOAH releases **recommendations** related to vaccine strains!



World Organisation
for Animal Health
Founded as OIE

Expert surveillance panel on equine influenza vaccine composition

8th July 2021 and 7th July 2022 by Videoconference

Conclusions and Recommendations

However, many vaccine products are not updated
and still use old vaccine strains...

Committee of selection on animal influenza vaccine strains in Japan

- Organized by National Veterinary Assay Laboratory, MAFF
 - Reviewing avian and equine influenza vaccine strains
 - If needed, the committee changes vaccine strains
 - The latest changes were in 2016
- according to WOAHP recommendations



(Photo from NVAL, MAFF HP)

Vaccine schedules

Vaccination requirements of equestrian/horse racing authorities

	FEI	BHA (UK)	Japan	Summary
Primary vac. (V1 and V2)	21-60D	21-60D	14-60D	14-60D
First booster (V3)	Within 6M +21D	120-180D	Within 7M	About 6M
Booster (V4, V5...)	Within 1 yr (Minimum)	Within 6M	Within 1 yr (Minimum)	Within 1 yr
Booster (Competition)	Within 6M +21D	Within 6M	Within 7M	About 6M

Vaccination requirements of equestrian/horse racing authorities

	FEI	BHA (UK)	Japan	Summary
Primary vac. (V1 and V2)	21-60D	21-60D	14-60D	14-60D
First booster (V3)	Within 6M			About 6M
Booster (After)				Within 1 yr
Booster (Competition)	+21D	6M		About 6M

● V1 should start after 5-6 months of age
 - Interference by maternal antibody
 - Maturation of foal's immune response
 (Paillot, Vaccines 2014)

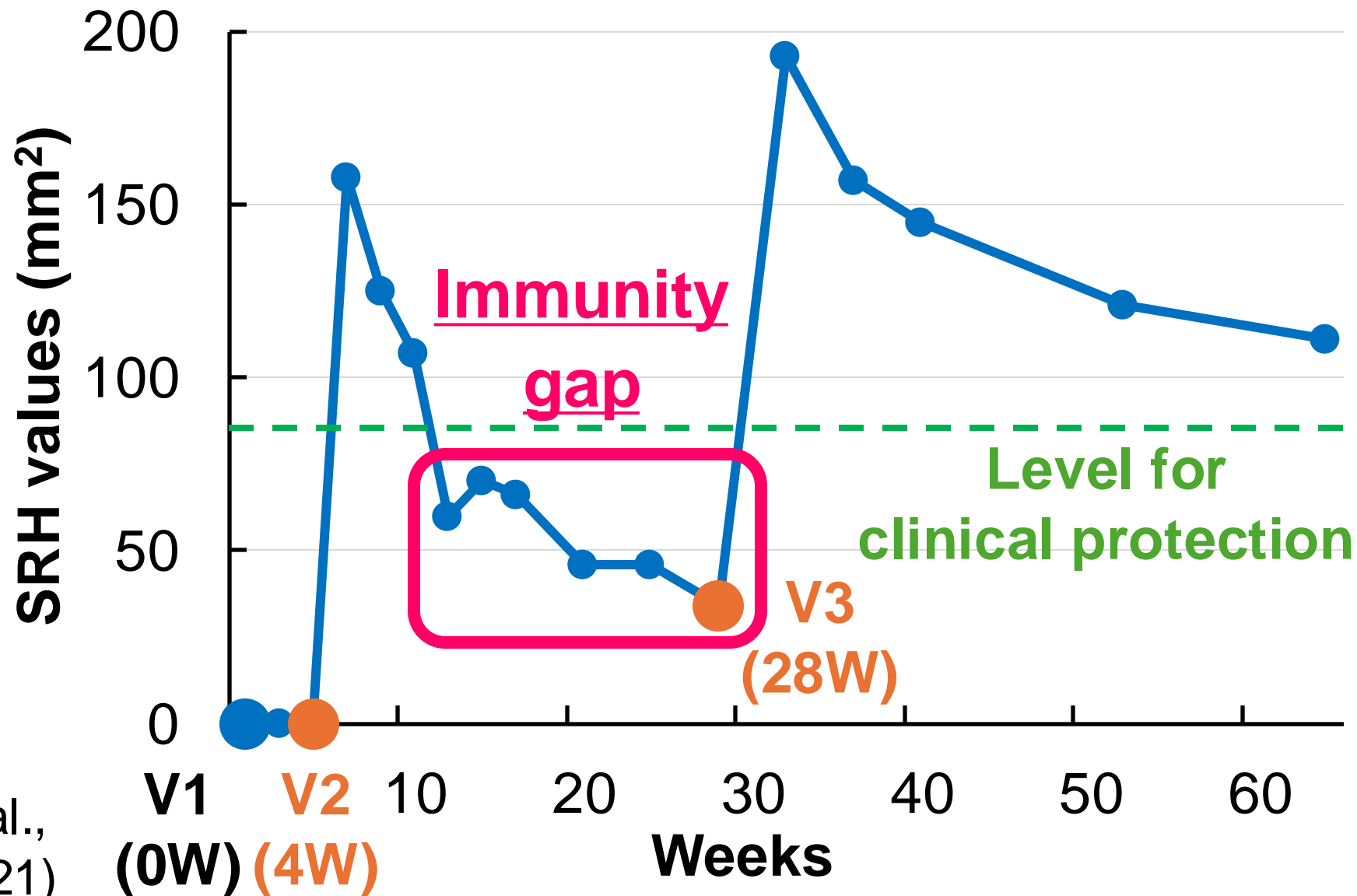
Vaccination requirements of equestrian/horse racing authorities

	FEI	BHA (UK)	Japan	Summary
<ul style="list-style-type: none"> ● Annual booster shot should not be relied on as the sole preventative measure (Gildea et al., Equine Vet J 2020) → Biannual shot is recommended 				
Booster (After V4)	Within 1 yr (Minimum)	Within 6M	Within 1 yr (Minimum)	Within 1 yr
Booster (Competition)	Within 6M +21D	Within 6M	Within 7M	About 6M

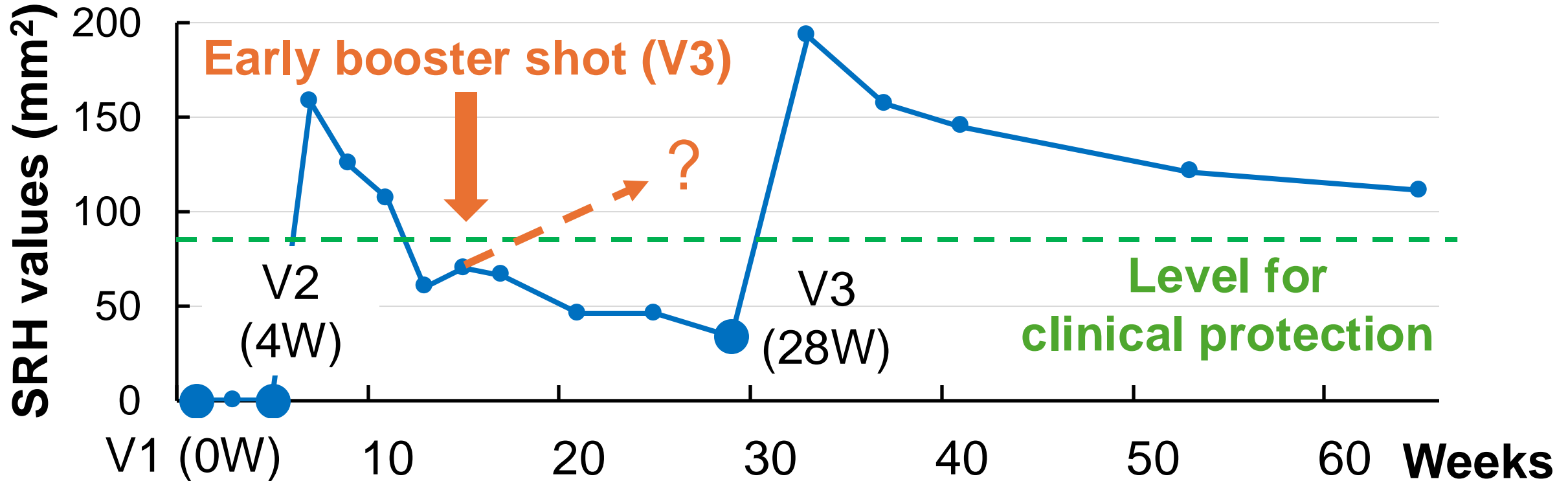
Example of SRH antibody level after vaccinations

	Summary
Primary vac. (V1/<u>V2</u>)	14-60D
First booster (<u>V3</u>)	About 6M

(Data from Dilai et al., J Equine Vet Sci 2021)



Is early booster shot beneficial to shorten the gap?



■ **Beneficial**: Cullinane et al., Vet J 2001; El-Hage et al., Equine Vet J 2013

■ **Not beneficial**: Heldens et al., Vet J 2007

→ **There is no clear solution for the immunity gap...**

Two training centers (TC) of JRA

- They are in Miho (Ibaraki Pref.) and Ritto (Shiga Pref.)
- About 2,000 horses are at each TC
- Once an outbreak occurs, virus spreads quickly
→ It is important to control by vaccination

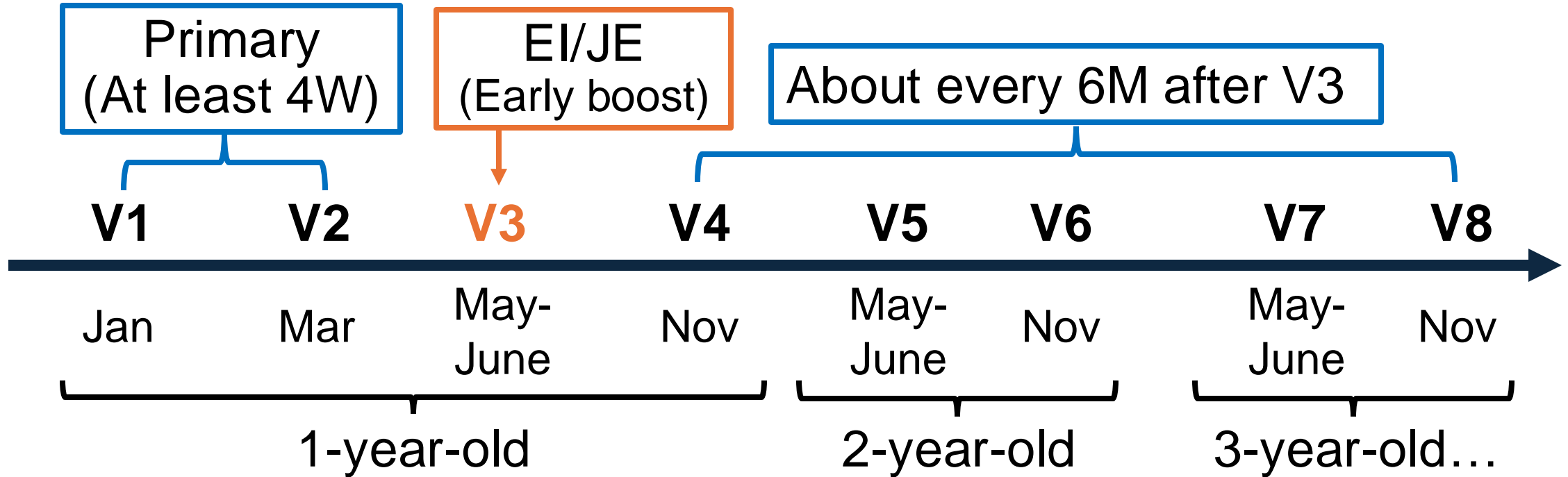


Miho TC: 2,240,000 m²



Ritto TC: 1,522,000 m²

Recommended EI vaccination schedule in Japan

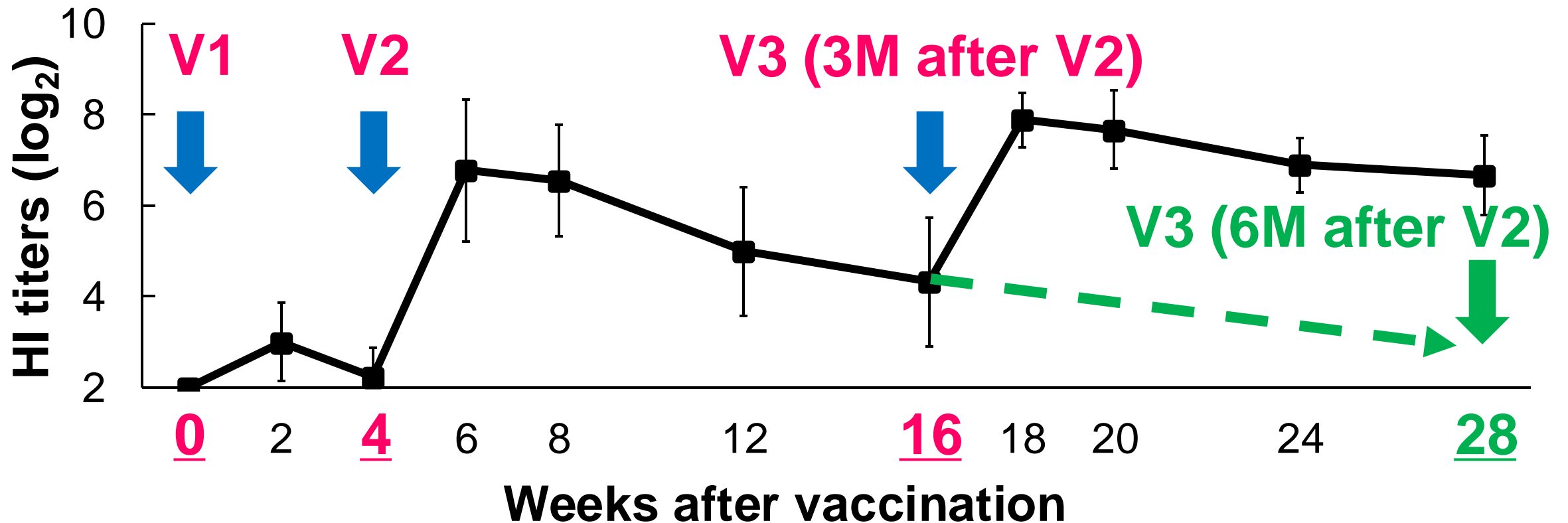


Subsidies: To increase the vaccination coverage

- 1- and 2-yr-old horses before entering TC: **50% (JLIA)**
- Racehorses kept at TC: **100% (JRA)**

Immunity gap between V2 and V3 is shortened by recommended schedule in Japan

- An inactivated vaccine without adjuvant (Nisseiken, Tokyo) was inoculated into nine 1-year-old horses three times

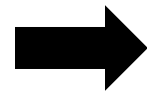


(Data from Ohta et al., J Equine Vet Sci 2022)

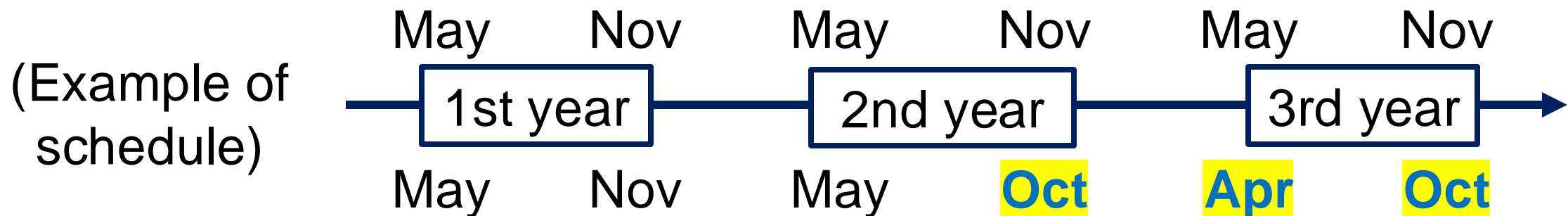
Intervals of booster vaccination for competition horses

FEI	BHA (UK)	Japan
Within 6M+21D	Within 6M	Within 7M

Within 6M+21D
or Within 7M



- Vaccination months can be fixed
- It is easy to manage both EI and JE



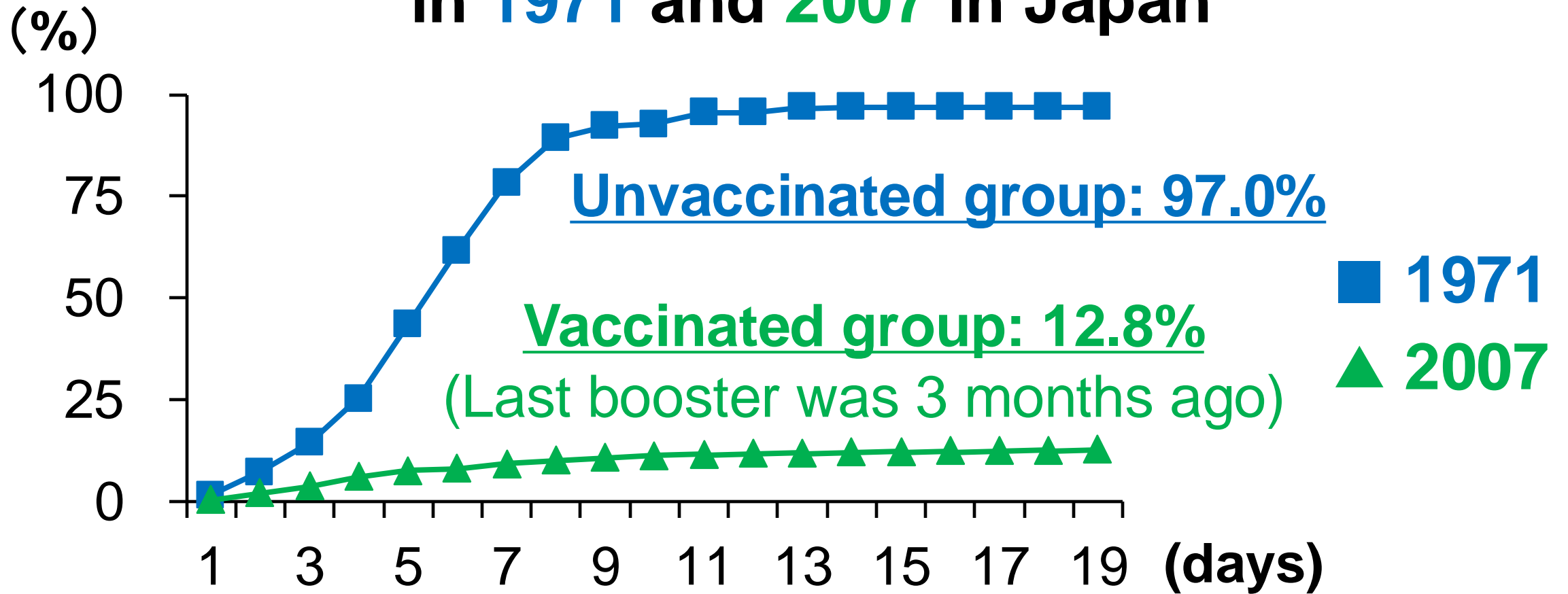
Within 6M → Vaccination months can change from year to year

Booster shot: Within 6 or 7 months?

Age	Post vaccination months	Vaccination numbers	HI titer	
2	5-6 months: n=34	4	92] No significant difference
2	6-7 months: n=34	4	75	
3	5-6 months: n=36	6	78] No significant difference
3	6-7 months: n=36	6	59	

- Although HI titers were lower in the group 6-7 months, there was no significant difference
- Within 7 months should be practical to manage many horses

Rate of febrile horses (%) in two outbreaks in 1971 and 2007 in Japan



- Febrile horses dramatically declined!
- Vaccination minimized damage to industry

Conclusions

- It is important to change vaccine strains quickly according to the recommendations
- After primary vaccination, booster vaccination every about 6 months is recommended
- At a site with many horses, high coverage and systematic vaccination are important to minimize outbreaks