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PVS Pathway and One Health tools for efficient Veterinary Services

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ORAL RABIES VACCINE STUDIES IN THAILAND

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Veterinary Officer, Professional level

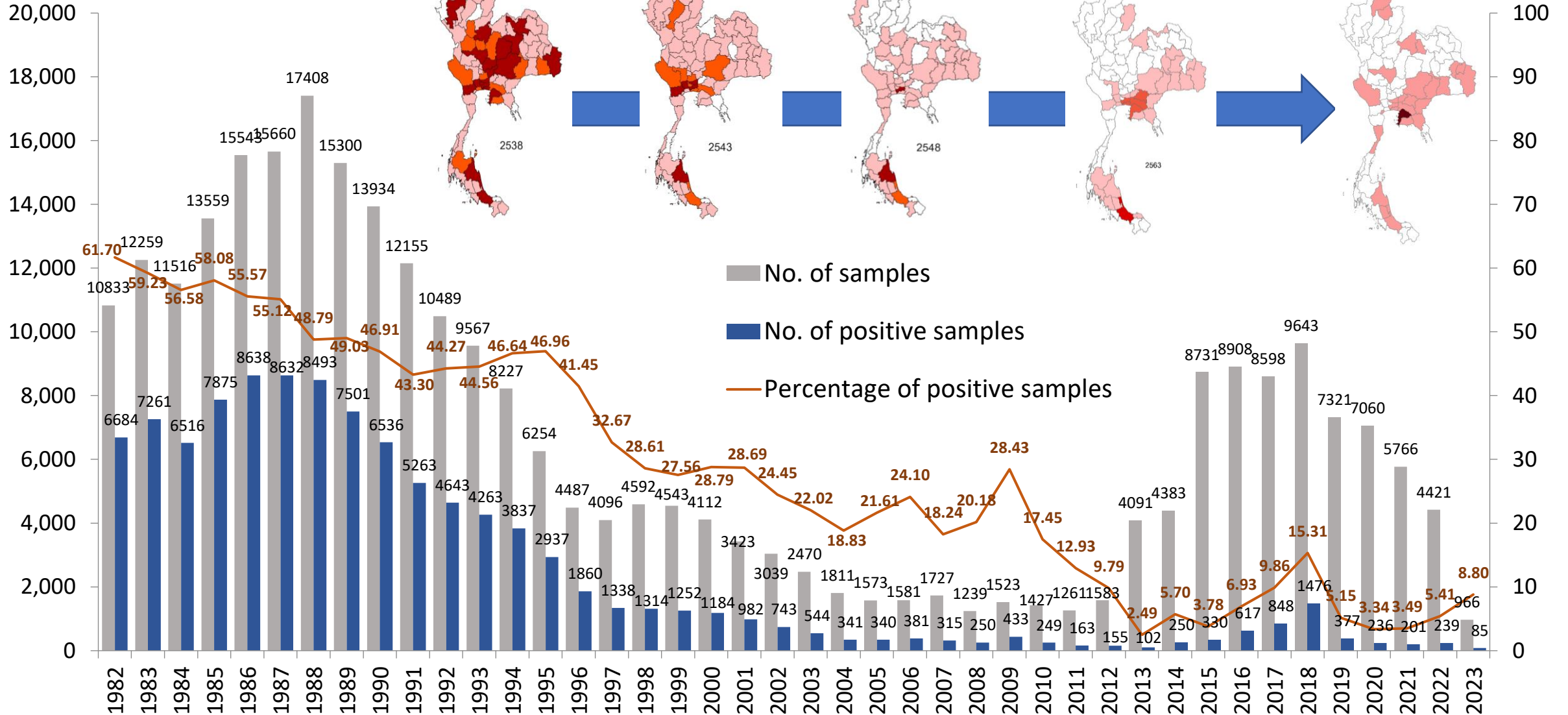
The Bureau of Disease Control and Veterinary Services,
The Department of Livestock Development (DLD)



Rabies situation in animal in Thailand

Number of Samples

Percentage (%)



Dog type in Thailand

Owned dogs



Owned confined



Owned roaming

Strayed dogs



Community Dogs

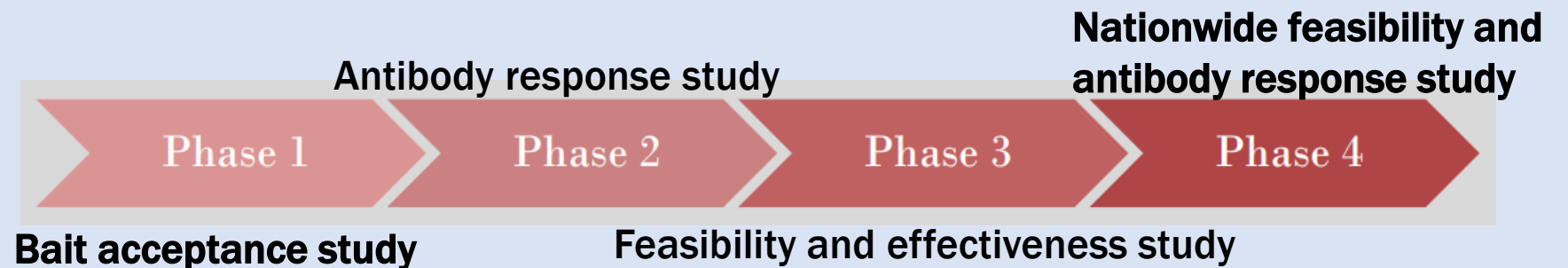


Wild Dogs

According to data from year 2016 to 2020

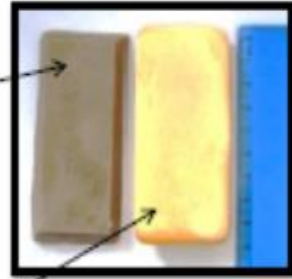
- More than 50% of rabid animals were strayed nor unknown background
- More than 80% of rabid animals were unvaccinated nor unknown history of vaccination (>50% were strayed dog)

Framework for Oral Rabies Vaccine (ORVS) studies in Thailand



Phase 1 Bait acceptance study

206 Fishmeal baits
(brown)

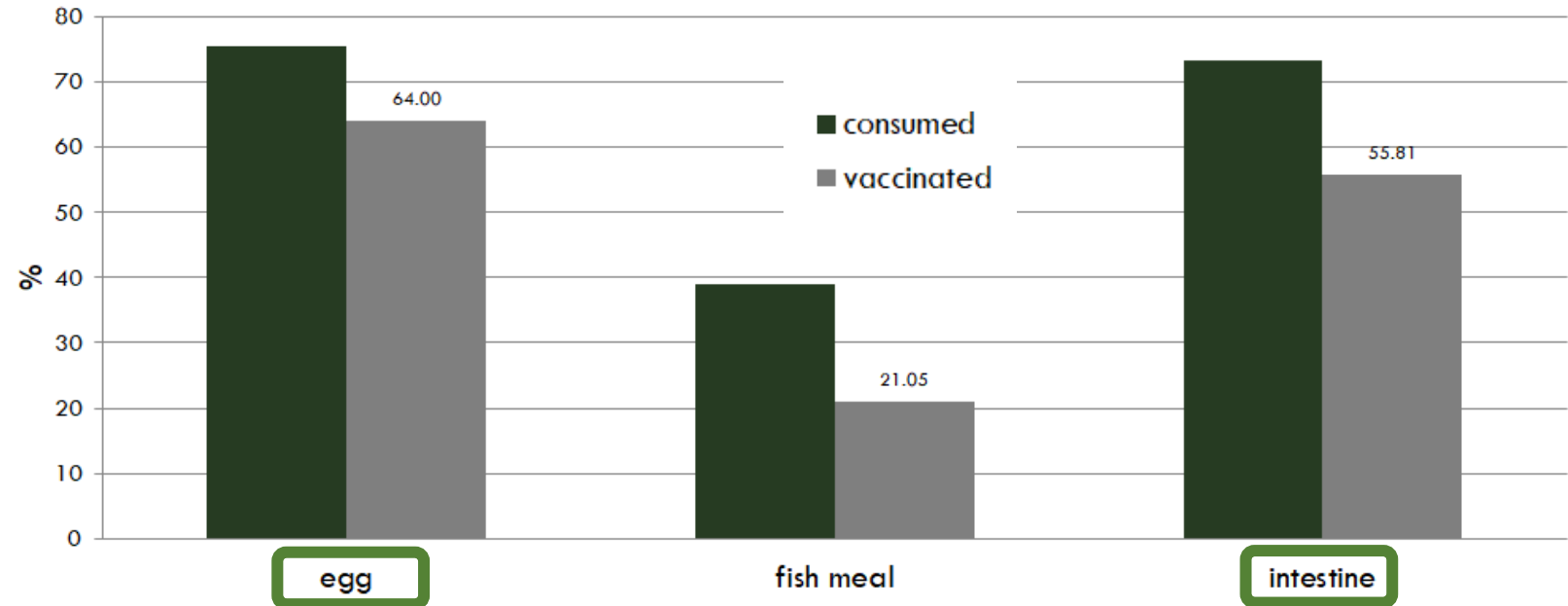


196 Egg-flavored
baits (yellow)

206 Intestine baits
(in collagen cases)



@ Free-roaming dogs in Kamphaeng Saen campus of the Kasetsart University, and the surrounding temples in Nakhon Pathom province



- Vaccine delivering (Dye solution) in the oral cavity was more successful in egg-flavored bait.
- The vaccine sachet (Dye solution) was too obvious in the collagen case and some stray dogs in Thailand carefully nibbled the baits.
- Published: Kasemsuwan S, Chanachai K, Pinyopummintr T, Leelalapongsathon K, Sujit K, Vos A. Field Studies Evaluating Bait Acceptance and Handling by Free-Roaming Dogs in Thailand. Vet Sci. 2018;5(2):47. Published 2018 May 4. doi:10.3390/vetsci5020047

Phase 2 Antibody response study

- B** Placebo (PBS) with Bait 7 dogs
- RABITEC D/DOA 10 dogs
- B** RABITEC D/Bait/Blister 15 dogs
- 📄** Bayovac/SC 10 dogs
- C** Control 4 dogs

D1	D3	D5	D7	D9	D11	D14	D15	D18	D20	D21	D23	D25	D27	D29	D31	D34	D36	D37	D39	D41	D43	D45	D45
📄	•••	📄	📄	📄	📄	📄	📄	📄	📄	B	•••	B	B	B	B	B	B	•••	•••	•••	C	C	C
D2	D4	D6	D8	D10	D12	D13	D16	D17	D19	D22	D24	D26	D28	D30	D32	D33	D35	D38	D40	D42	D44		
B	•••	📄	B	B	B	B	B	B	B	B	•••	B	B	B	B	B	B	•••	•••	•••	C		



Humoral Immune Response of Thai Dogs after Oral Vaccination against Rabies with the SPBN GASGAS Vaccine Strain

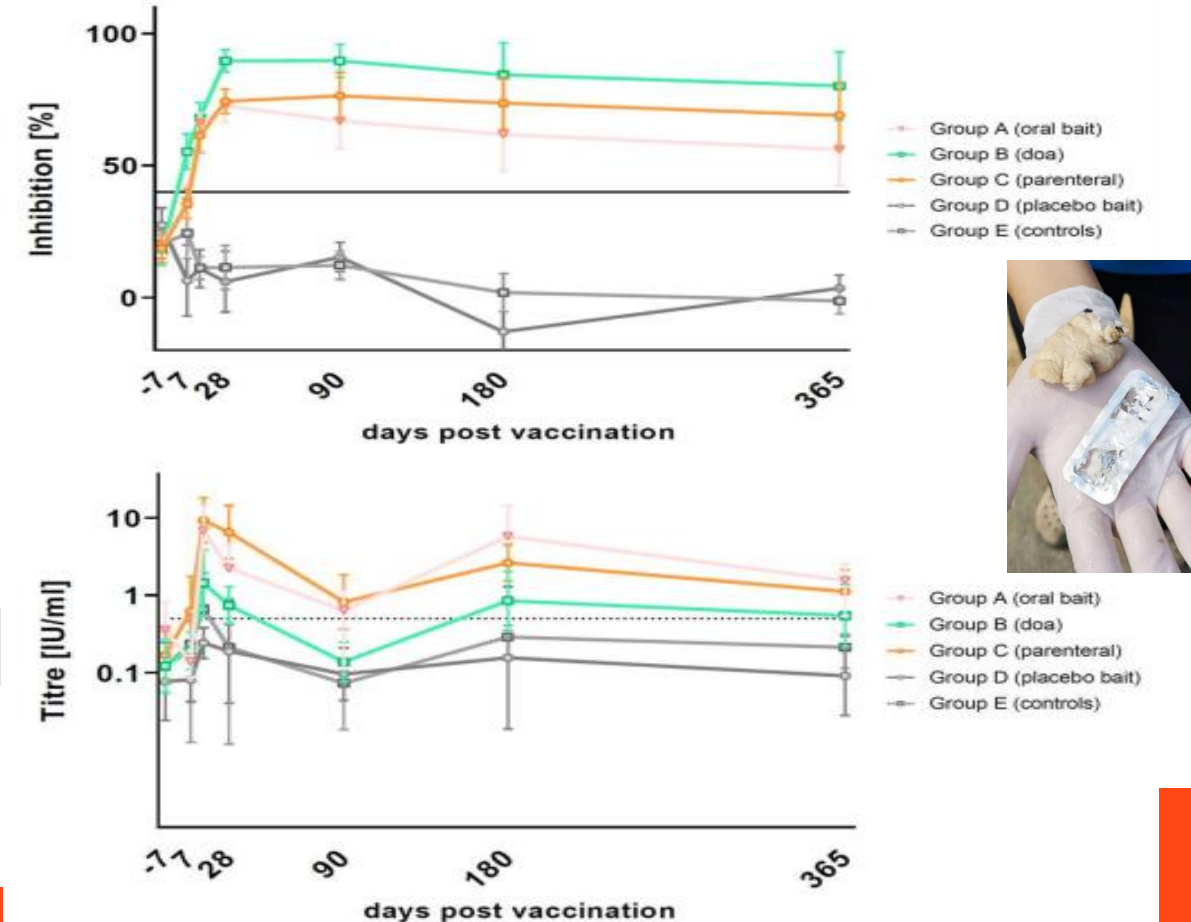
[Kansuda Leelahapongsathon](#),¹ [Suwicha Kasemsuwan](#),¹ [Tanu Pinyopummintr](#),¹ [Orawan Boodde](#),¹ [Parinya Phawaphutayanchai](#),² [Nirut Aiyara](#),² [Katharina Bobe](#),³ [Ad Vos](#),³ [Virginia Friedrichs](#),⁴ [Thomas Müller](#),^{5,*} [Conrad M. Freuling](#),^{5,*} and [Karoon Chanachai](#)⁶

- ORV: Live Attenuated rabies virus strain SPBN GASGAS (Ceva Santé Animale, Germany)
- 46 young dogs (26 males and 20 females) at Bangkok Metropolitan Administration's dog shelter in Taptan, Uthai-Thani province

ELISA



RFFIT



Phase 3 Feasibility and effectiveness study

Feasibility and Effectiveness Studies with Oral Vaccination of Free-Roaming Dogs against Rabies in Thailand

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- 83% vaccination success (dogs accepted bait and chewed)
- ORV increased vaccine coverage from 0% to 65.6%

Percentage of dogs interested in bait offered, dogs that chewed very shortly (<10 s), swallowed the sachet and considered vaccinated per bait type offered

Bait Type	No. of Dogs Offered a Vaccine Bait	No. of Dogs Interested in Bait (% [n/N]) *	Sachet Swallowed (% [n/N])	Chewing Time (<10 s) (% [n/N])	Vaccinated ** (% [n/N])
Intestine	1314	92.9 (1209/1302)	80.0 (929/1161)	42.5 (480/1130)	82.0 (995/1214)
Egg	338	87.3 (288/330)	32.2 (88/273)	24.0 (58/242)	83.6 (255/305)
Egg+	278	92.8 (256/276)	26.5 (65/245)	24.6 (60/244)	87.0 (235/270)
total	1930	91.9 (1753/1908)	64.4 (1082/1679)	37.0 (598/1616)	83.0 (1485/1789)

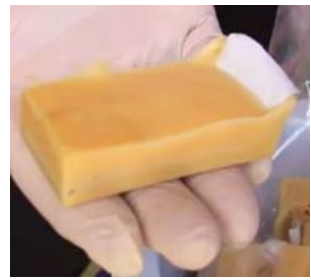
Oral rabies vaccination coverage in the free-roaming dog population in 5 study areas

Study Area	Nr. of Sites	Nr of Inaccessible Dogs	Dogs Approached (% [n/N])	Dogs Accepting the Bait & Successfully Vaccinated (% [m/M])	Vaccination Coverage Achieved (%) *
Choen Noen	59	488	77.5 (378/488)	88.1 (310/352)	68.2
Cha Um	59	789	71.7 (566/789)	79.5 (387/487)	57.0
Phe	112	564	86.5 (488/564)	81.9 (381/465)	70.9
Thong Song	77	456	87.7 (400/456)	81.2 (315/388)	71.2
Tapraya	31	147	66.7 (98/147)	94.9 (92/97)	63.2
Total	338	2444	79.0 (1930/2444)	83.0 (1485/1789)	65.6

* vaccination coverage achieved (%) was calculated as follows: 100 (n/N * m/M).

- ORV: Live Attenuated rabies virus strain SPBN GASGAS (Ceva Santé Animale, Germany)
- Egg bait (commercial), pig intestine bait (local made), and Egg+ bait (cat liquid snack pasted on egg bait)

Phase 4 Nationwide feasibility and antibody response study



**Still on going on lab testing and data analysis

- ORV: Live Attenuated rabies virus strain SPBN GASGAS (Ceva Santé Animale, Germany)
- 12 study areas in all region of Thailand
- Serological monitoring following ORV in 5 study areas

*Incomplete data

Serology study

Start with 120 dogs

Provided Microchip ID

Day 0

Day 28

Day 90

Serum collection

Serum collection

Serum collection

Oral rabies vaccination



ELISA test

Successful vaccination

25 dogs (75.76%) from 33 naïve dogs

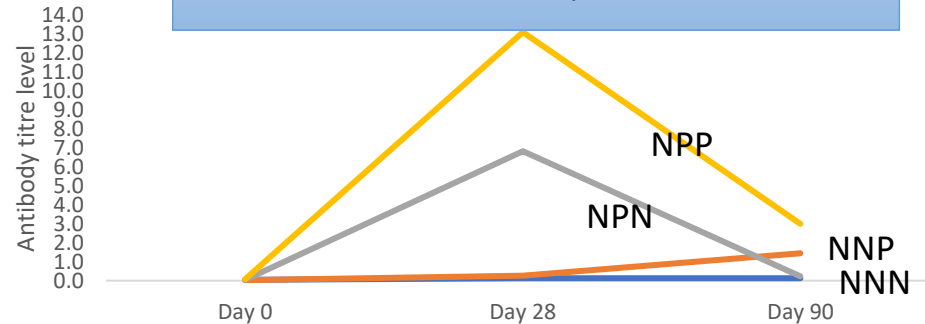
FAVN test

Result D90

	Result D28	Negative	Positive	Total
Negative		34 (39%)	7 (8%)	41 (47%)
Positive		16 (18%)	30 (34%)	46 (53%)
	Total	50 (57%)	37 (43%)	87 (100%)

Ownership status	Number of dogs offered a vaccine bait	% of bait consumption (dog chewed vaccine bait)	% of vaccinated (sachet perforation)
Ownerless dogs	1379 (75.8%)	81.9% (1130 / 1379)	93.0% (1020 / 1097)
Owned dogs	338 (18.6%)	70.1% (237 / 338)	98.2% (222 / 226)
Unidentified dogs	103 (5.7%)	65.1% (67 / 103)	93.6% (58 / 62)
Total	1820	78.8% (1434 / 1820)	93.9% (1300 / 1434)

Average of Antibody titer from FAVN divided by group of immune response



12 study areas

Conclusion

- Stray dogs in Thailand preferred egg and pig intestine bait.
- SPBN GASGAS oral rabies vaccine could induce dog's immune response the same as parenteral vaccine.
- Oral rabies vaccine could improve vaccine coverage in free-roaming dog population in Thailand up to 65%.
- The ORV were feasible to use by staffs in the area with more than 90% of vaccination successful rate.
- It is likely that the booster dose is still necessary at 1 month after first ORV
- Vaccine safety
 - No vaccine-induced adverse effect in captive dogs for 1-year observation period
 - No adverse effects in dogs or humans after ORV campaign



What to do next?

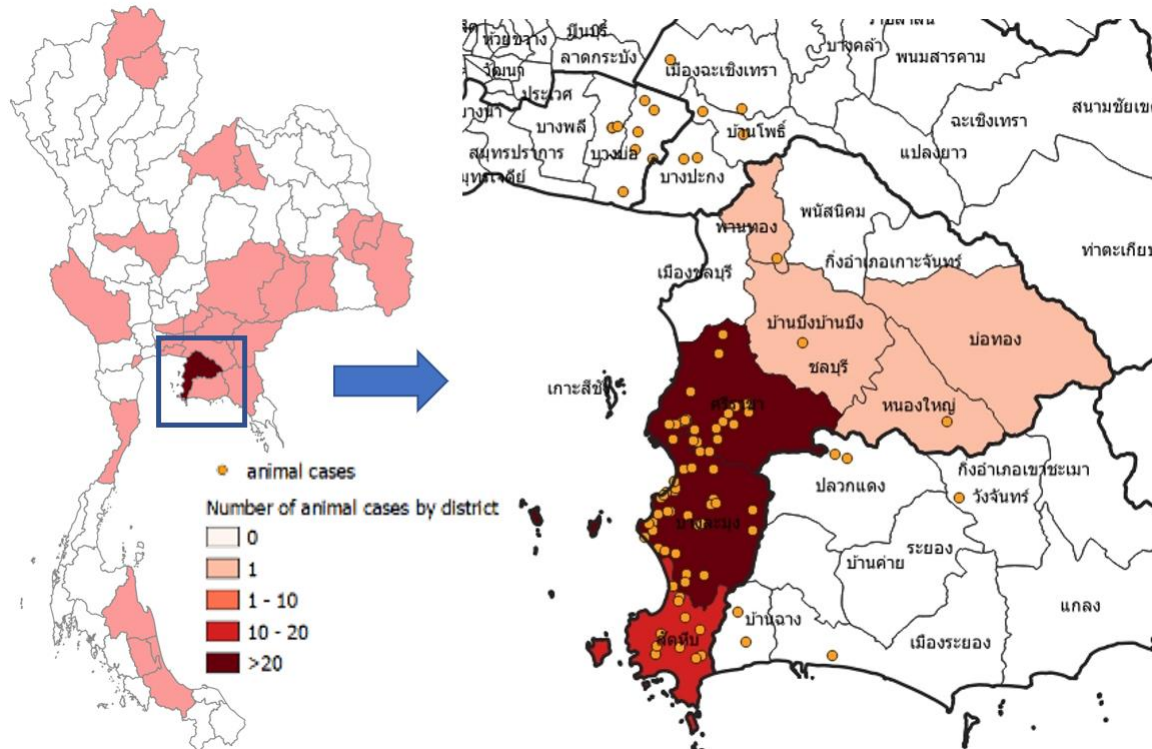
Key Note of concern:

- The ORV still have not been registered to the Food and Drug Administration (FDA) in Thailand.
- Should we use the ORV as a alternative vaccine in stray dogs without restriction?

First step: Restrict the usage → use by DLD Veterinary officer for disease control



Phase 5 The effectiveness of using oral rabies vaccine accompany with parenteral rabies vaccine in endemic areas in Thailand



Objectives

- To use ORVs in high endemic areas in Thailand as alternative rabies vaccine for inaccessible dogs to parenteral vaccination
 - To control rabies spreading in high endemic areas in Thailand
- Targeted areas are the high-risk area regarding to the previous rabies situation in Thailand
- Chonburi province;**
- Bang Lamung District
 - Si Racha District
 - Sattahip District

THANK YOU

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