CURRENT FMD LABORATORY ACTIVITIES IN [MYANMAR]

SEACFMD Labnet Meeting
Pakchong, Thailand
November 4-5, 2019

OUTLINE

- FMD situation
- FMD laboratory diagnosis, including virus serotyping and genotyping report
- FMD research activities and achievements
- Post vaccination monitoring activities and results
- Quality assurance
- Constraints and possible solution
- Future Plans

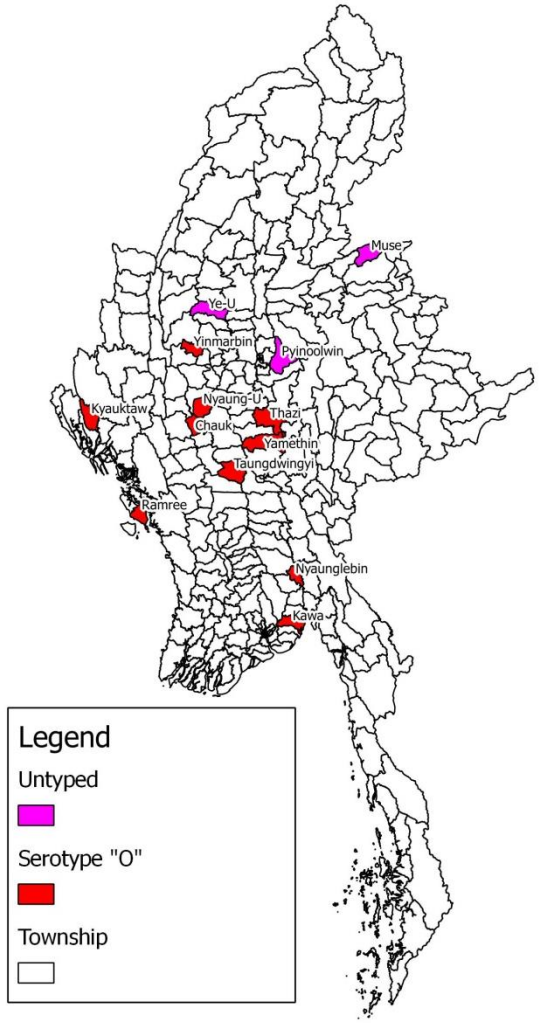
FMD Situation

Myanmar is FMD endemic country.

- **Serotype O (Mya98):** Predominant Strain
  - **O/Ind-2001d**: in 2015 in Maung Taw township, Rakhine State and widely spread in 2017
- **Serotype A/SEA-97**
  - in 1999 in Tanintharyi Region
  - in 2010 in Rakhine State
  - in 2015 in Mandalay Region
- **Serotype Asia1**
  - in 2005 in Kayah State and Magway Region
  - in 2017 in Rakhine State

FMD SITUATION (2018)

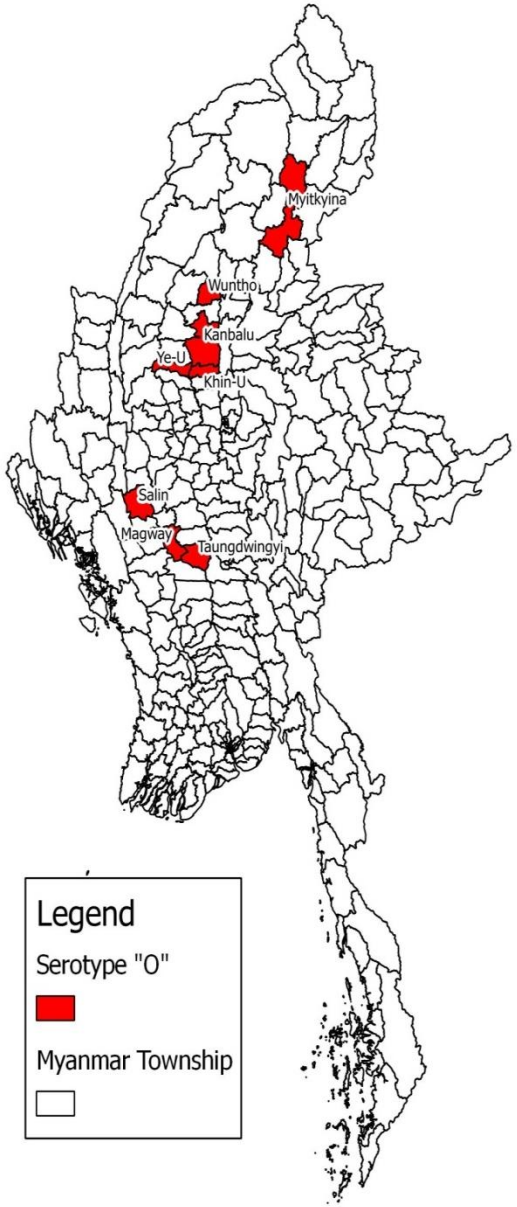
Month	States/ Regions	Townships	Affected Villages	Myanmar Lab -Result
May 18	Rakhine	Kyauktaw	21	Type “O”
		Ramree	8	Type “O”
Sept 18	Mandalay	Pyin Oo Lwin	1	Untyped
Oct 18	Bago	Nyaunglebin	4	Type “O”
	Shan	Muse	2	Untyped
	Mandalay	Thazi	1	Type “O”
		NyaungU	1	Type “O”
		Yamethin	1	Type “O”
	Magway	Chauk	2	Type “O”
Nov 18	Bago	Kawa	1	Type “O”
	Sagaing	YeU	1	Untyped
		Yinmarbin	4	Type “O”
	6	**12**	**47**	



CURRENT FMD SITUATION

FMD SITUATION (2019)

Month	States/ Regions	Townships	Affected Villages	Myanmar Lab –Result
Jan 2019	Magway	Taungdwingyi	1	Type “O”
July 2019	Sagaing	Kanbalu	1	Type “O”
July 2019	Kachin	Myitkyina	1	Type “O”
Sept 2019	Magway	Salin	1	Type “O”
Oct 2019	Sagaing	Wuntho	1	Type “O”
Oct 2019	Sagaing	Khin-U	2	Type “O”
Oct 2019	Sagaing	Ye-U	4	Type “O”
Oct 2019	Magway	Magway	1	Type “O”
	Total	**8**	**12**	



CURRENT FMD SITUATION

FMD Virus characterization (serotyping and genotyping)

Year	No. samples submitted to national lab	No. of serotype O viruses	No. of serotype A viruses	No. of serotype Asia 1	No virus detected
2017	43	36	-	4	3
2018	44	20	-	-	24
2019	38	26	-	-	12

- No virus detected samples – poor quality of sample

FMD Virus characterization (serotyping and genotyping)

Year	No. of samples submitted to RRL/WRL	O/ Mya-98	O/ PanAsia	O/ Cathay	O/Ind2001d *O/Ind2001e	A/ SEA-97	Asia 1
2017	32	3	-	-	11	-	1
2018	20 (Japan/ APQA)	4			*6		
2019	15	1	-	-	*1	-	-

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FMD Genotyping Report

Lab Reference WRL batch Number: WRLFMD/2019/00024

Sender Details: Dr. Bolortuya Purevsuren, Yangon FMD Laboratory, Research and Disease Control Division, Livestock Breeding and Veterinary Department,, No. 36, Ministry of Agriculture, Livestock and Irrigation, Nay Pyi Taw, Republic of Myanmar, EMAIL - b.purevsuren@oie.int, PHONE - 95-9-799463695

Date Received: 23/05/2019

Country of Origin*: MYANMAR

Sequencing work has now been completed in respect of the samples you submitted and the details are as attached. Please note that all of our phylogenetic trees can be accessed via the internet at: http://www.wrlfmd.org/

Results Approved By:

Official Stamp:

Date: 2/7/2019

DR DONALD KING
HEAD: Vesicular Disease Reference Laboratories
The Pirbright Institute
GU24 0NF

c.c.: L Bakkali-Kassimi, A Bin-tarif, D King, M Henstock, N Knowles, A Ludi, N Lyons, N Mapitse, S Metwally, V Mioulet, S Parida, J Pinto, E Raizman, B Statham, K Sumption, J Wadsworth, B Wood, FAO Circulation, OIE Animal Health Information, Regional OIE Delegate.

To help us improve the quality of our service, please send any suggestions or requests to the Reference Laboratory by email (reflabsfeedback@pirbright.ac.uk).

* Data supplied by the customer

Batch: IAHB/2019/00363

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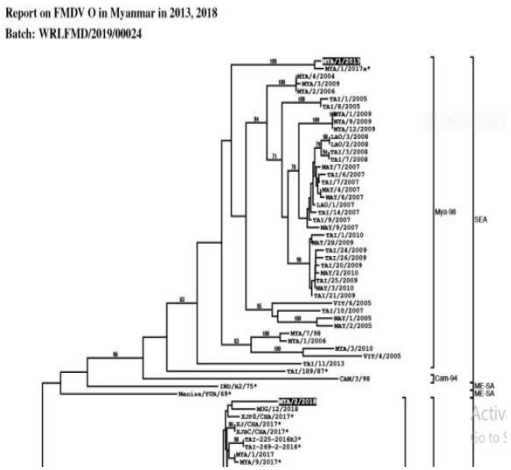


Report on FMDV O in Myanmar in 2013, 2018

Batch: WRLFMD/2019/00024

Mya-98

SEA

Cam-94

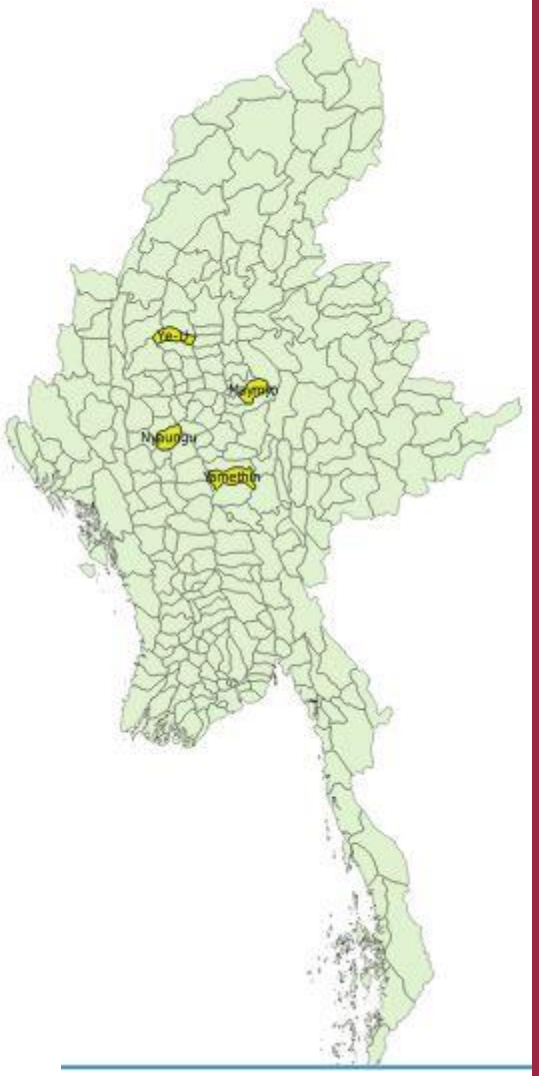
ME-SA

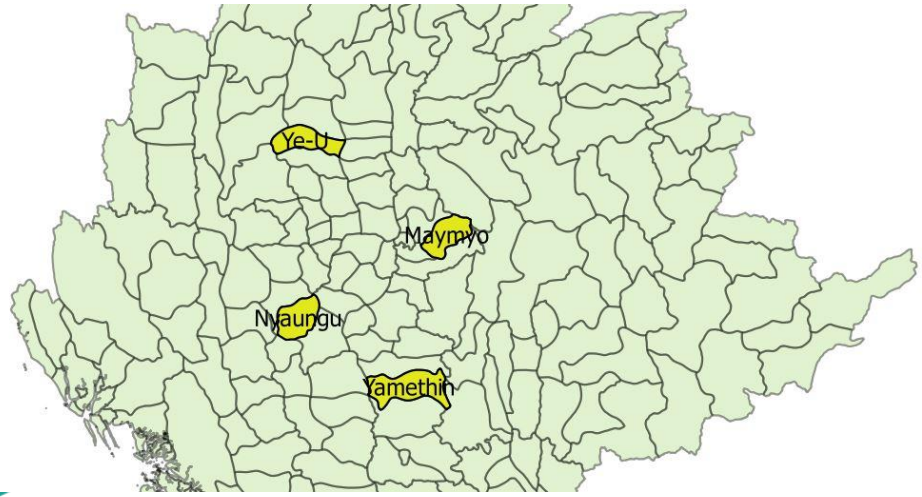
ME-SA

Outbreak Investigation (2018)

FMD Outbreak Investigations in 2018
1.Pyin Oo Lwin Township
2.Nyaung U Township
3.Yamethin Township
4.YeU Township

❖ FMD outbreaks occurred in 12 townships, Affecting 2959 animals in Bago, Magway, Mandalay, Rakhine, Sagaing and Shan Regions

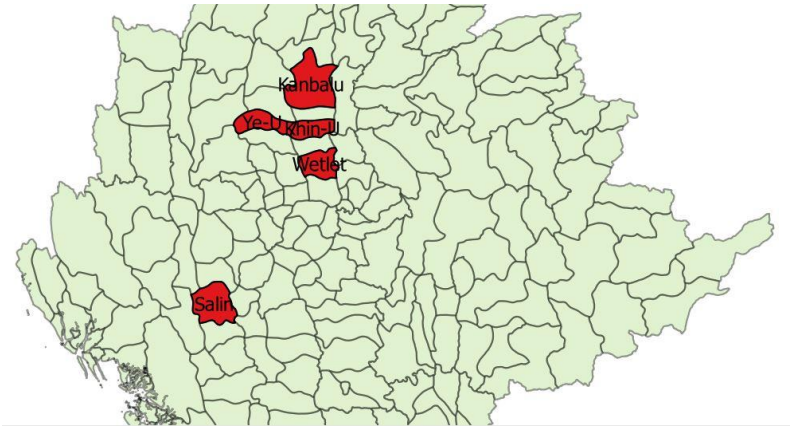




Outbreak Investigation (2019)

1.Kantnalu
2.Khin U
3.Wet let
4.Ye U Township
5.Salin Township

❖ FMD outbreaks occurred in 8 township in Magway, Sagaing Regions and Kachin State.



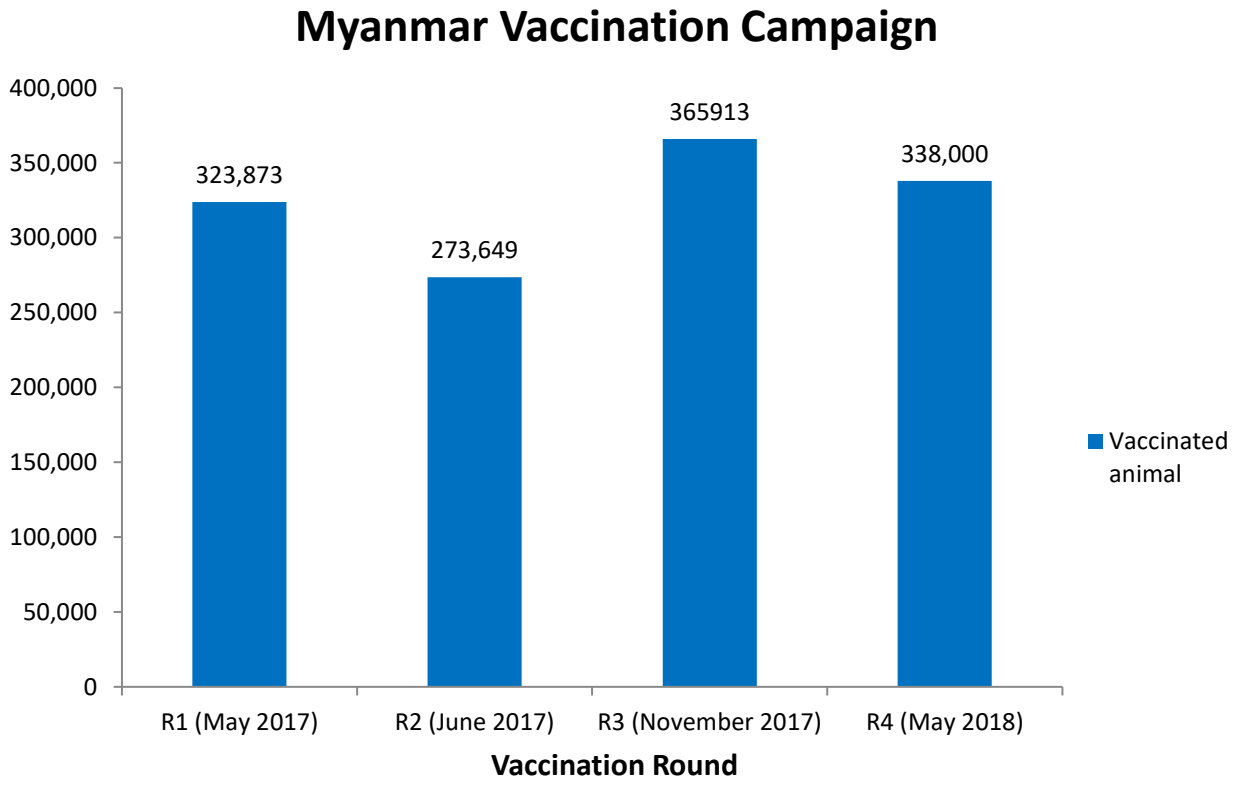
PVM activities and findings

OIE-LBVD FMD Myanmar Control Project :

Between May 2017-2018, 4 round vaccination campaign was completed in the 24 townships

1st PVM was conducted in 2017 (Type O and A)

2nd PVM was conducted in August 2018 (Type O, A and Asia-1)

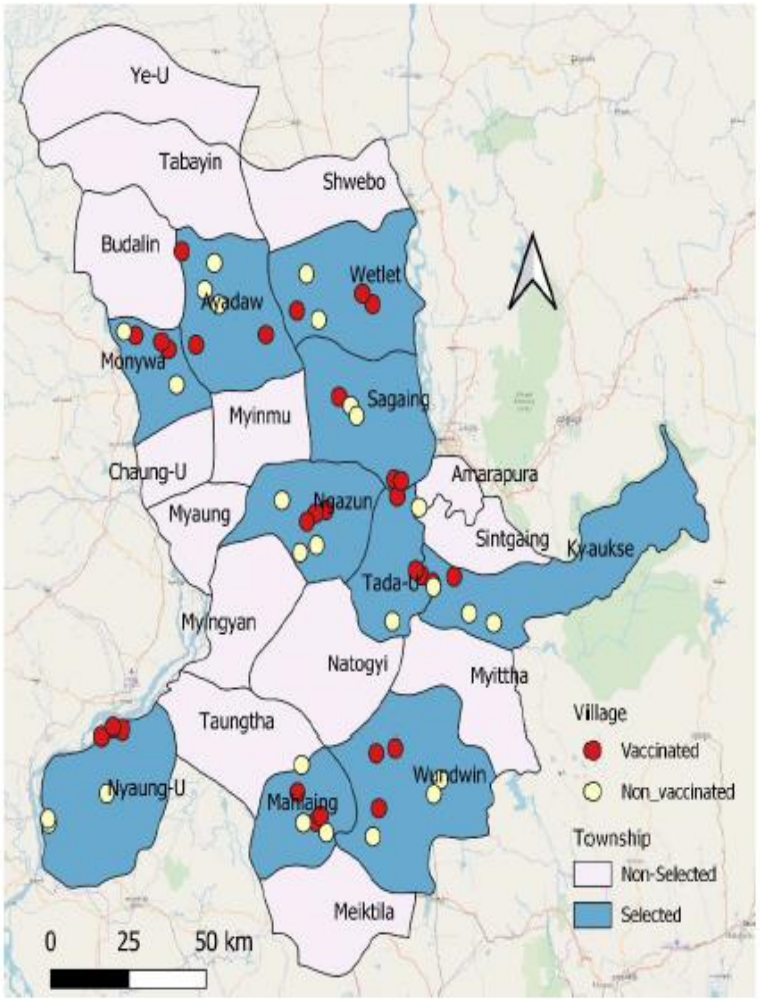


POST VACCINATION MONITORING

PVM activities and findings

Purpose of Study:

- To monitor the occurrence of FMD and evidence of circulating field virus in target and non-target villages
- To measure the level of herd immunity achieved through annual vaccination in the targeted villages
- To evaluate vaccination coverage of village and township level in target areas
- To confirm the vaccines are effective



Study Area:

- 4 townships in Sagaing region
- 6 townships in Mandalay region

PVM activities and findings

Methodology

1. Random Sampling

10 townships were selected among 24 townships

3 villages (vaccinated) and 3 villages (non-vaccinated)/township

15 blood samples/village

- 10 townships x 6 villages x 15 blood samples = 900
- Sampling across 3 age categories:
  - 1-18 months (~ 1 yr of exposure)
  - 19-36 months (~ 2 yrs of exposure)
  - > 36 months

PVM activities and findings

Methodology

2. Laboratory Testing

- Total of 900 samples (vaccinated & non-vaccinated) were tested by NSP ELISA (The interpretation of results: Pl value ≥ 50% - positive)
- 450 samples (vaccinated) were tested by LPB ELISA (Type O, A and Asia1) (The interpretation of results: Log10 titre ≥ 1.9 – positive)

3. Data Analysis

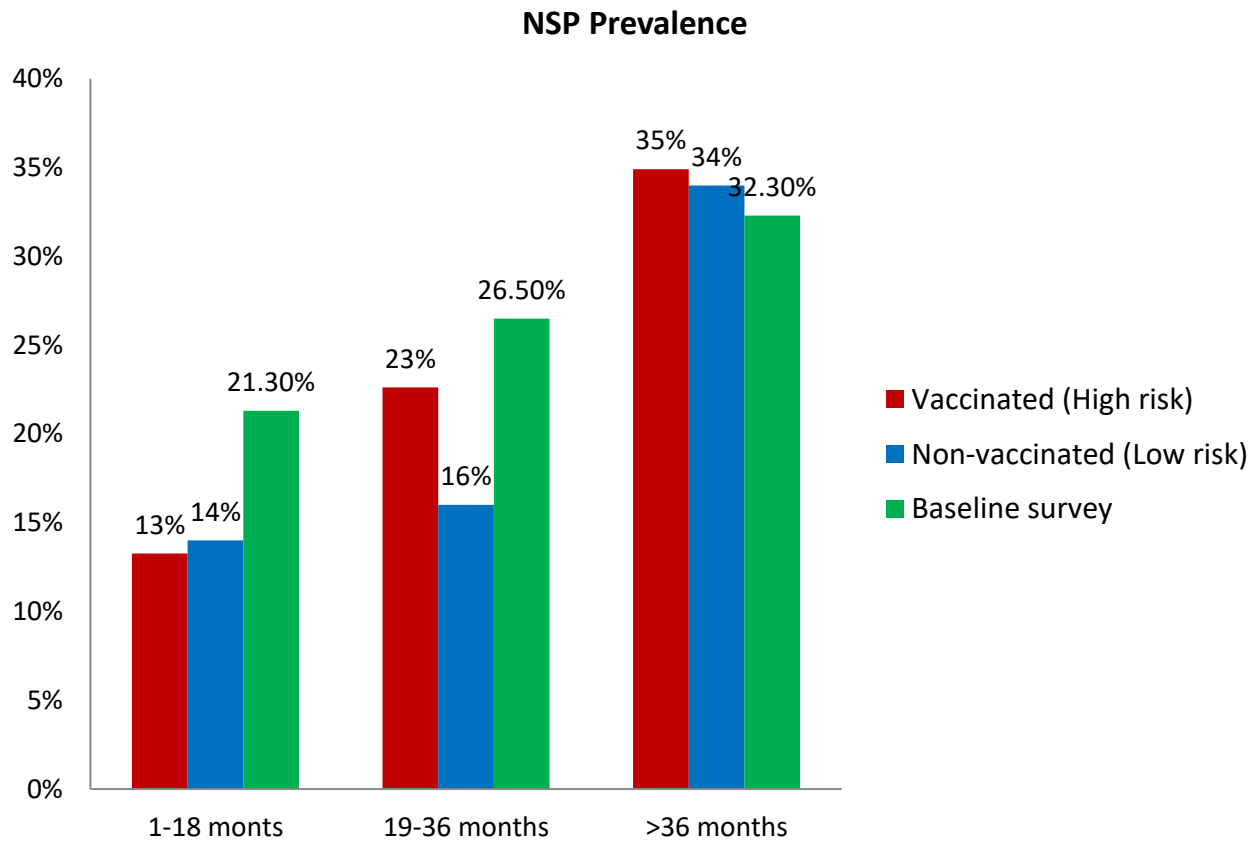
- Calculation of Vaccination Coverage (Expected: >90%)
- Measure the NSP antibody level by age categories
- Measure the Protective Immunity of Serotype O, A and Asia-1 of Village/Township Level at 95% Confidence Interval

Summary of PVM 2018 outcomes

Indicator	Target	Myanmar	
		Vaccinated	Non-Vaccinated
Number of villages sampled	30	30	30
Number of animals sampled	450	450	450
Age 1-18 months	150	113	104
Age 19-36 months	150	168	178
Age >36 months	150	169	168
Vaccination coverage (% animals) 2018	>90%	**96%**	-
NSP prevalence		**25%**	**22%**
Age 1-18 months	<10%	13%	14%
Age 19-36 months	<20%	23%	16%
Age >36 months	<40%	35%	34%

Measure of NSP Antibody Level in Vaccinated Villages (High Risk), Non-Vaccinated Villages (Low Risk) and BaseLlne Survey

- 25% (112/450) Sera positive in Vaccinated villages (High risk)
- 22% (100/450) Sera positive in Non-vaccinated villages (Low risk)
- 29% (1162/4075) sera positive in Baseline survey

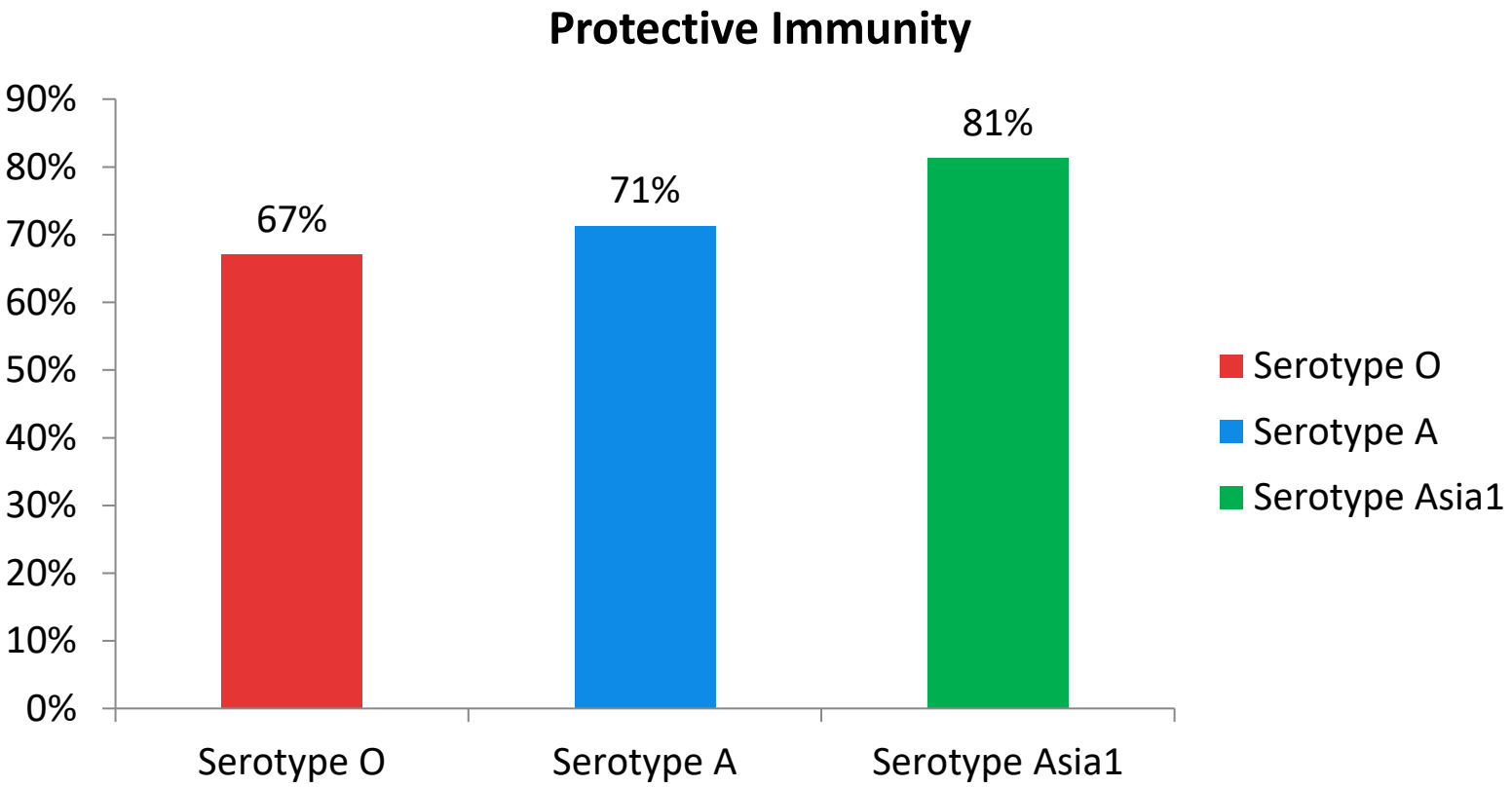


POST VACCINATION MONITORING

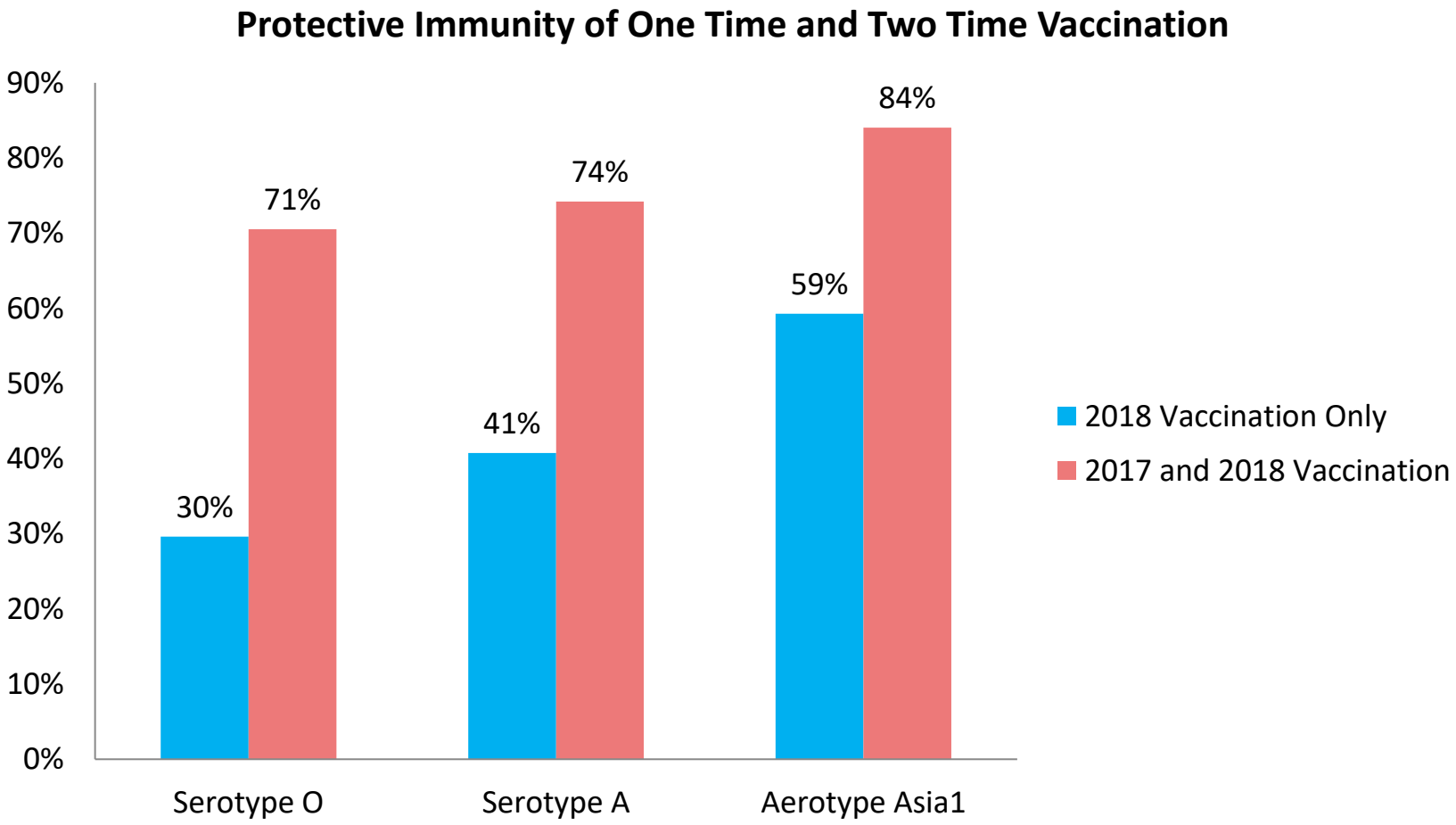
Summary of PVM 2018 outcomes (Con;)

Indicator	Myanmar		
	Serotype O	Serotype A	Serotype Asia1
Protective prevalence LPB ELISA	**67%**	**71%**	**81%**
One time-vaccinated/NSP-negative	30%	40%	53%
One time-vaccinated/NSP-positive	67%	67%	100%
Two time-vaccinated/NSP-negative	65%	70%	81%
Two time-vaccinated/NSP-positive	87%	87%	93%

Protective Immunity Level of Serotype O, A and Asia-1



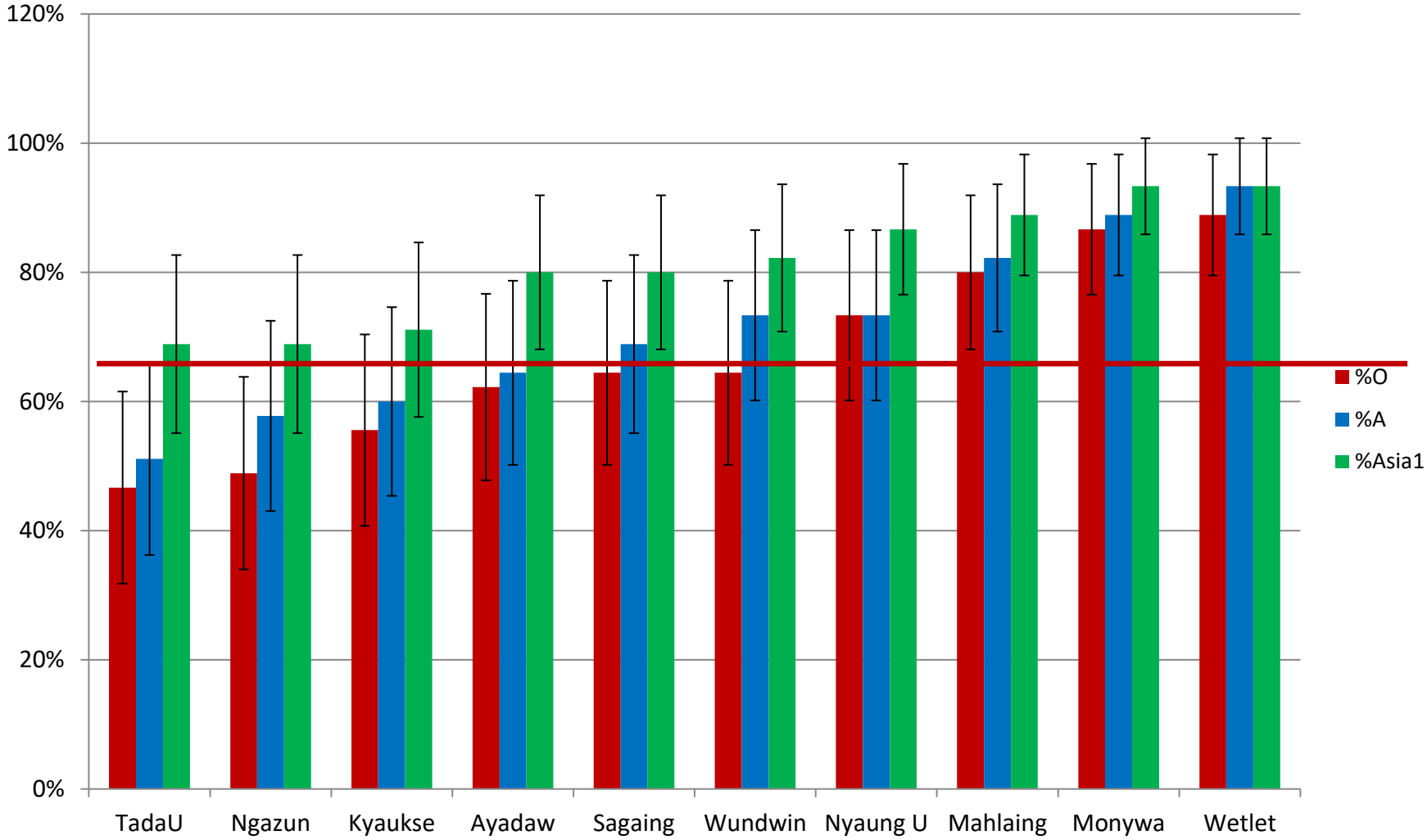
Comparison of Protective Immunity Level in One time and Two time vaccination



Summary of PVM 2018 outcomes (Con;)

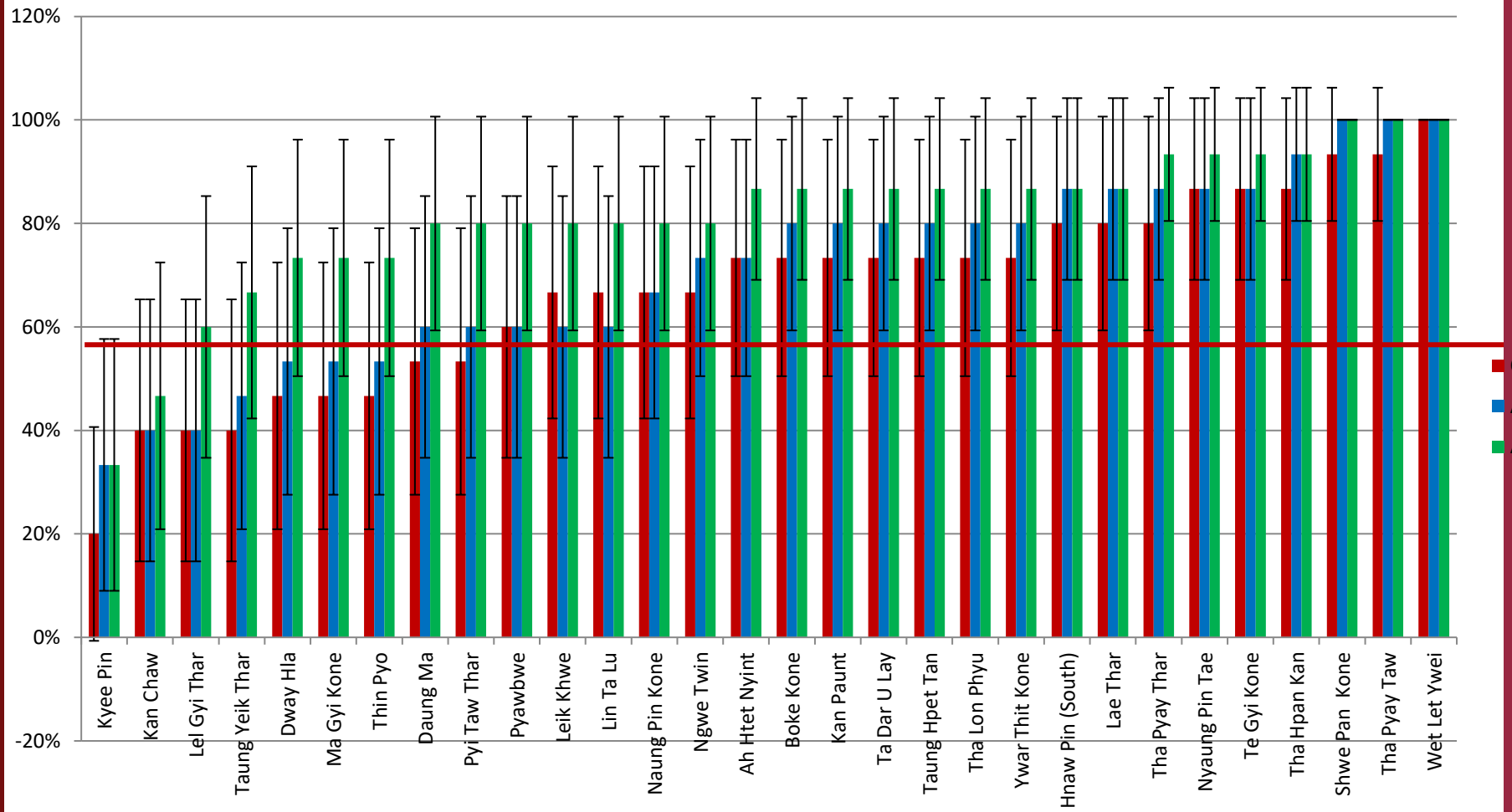
Indicator	Myanmar		
	Serotype O	Serotype A	Serotype Asia1
non-vaccinated/NSP-negative	38%	50%	50%
non-vaccinated/NSP-positive	50%	50%	50%
*vaccinated/NSP-negative	62%	67%	78%
*vaccinated/NSP-positive	86%	86%	93%
*** Vaccinated at least once**			

Township level Protective Immunity of Serotype O,A and Asia-1 (95% C.I)



POST VACCINATION MONITORING

Village level Protective Immunity of Serotype O,A and Asia-1 (95% C.I)



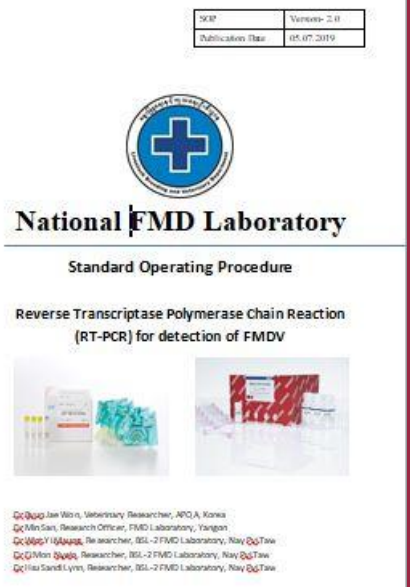
POST VACCINATION MONITORING

Conclusion

- Vaccination Coverage was 96% (Target:> 90%)
- NSP Prevalence in Vaccinated villages (High risk) is slightly higher than the Non-vaccinated villages (Low risk)
- Endemic level after vaccination (13% Vac, 14% non-vac) less than before vaccination (observed in <18 M calves)
- Vaccine derived antibody was higher than natural exposure (O:38% vs62% , A: 50 vs 67%, Asia1: 50% vs 78%)
- Protective immunity of O, A and Asia1 in two time vaccination is significantly higher than the one time vaccination
- Target herd immunity for both O, A and Asia-1 was achieved by almost 80% of vaccinated villages

Quality assurance

- Development of SOP (V2) for RT-PCR, Antigen, NSP , Virus Isolation and LP ELISA by Experts from Animal and Plant Quarantine Agency from South Korea.
- Internal Quality Control (IQC) (Supervised by MPI)
  - QC chart for ELISA (Control)
  - Excel sheets for progressive monitoring and calculating for all tests
- External Quality Control (EQC)
  - Equipment maintenance and Calibration
- Participation in proficiency testing conducted by RRL (2013,2015,2017)



Constrains and solutions

Constrains in FMD Lab/Research activities	Possible solutions
Reagents and chemicals	• Request to government to support more budget • Request to Developing partners
Sample submission	• Meeting with local veterinarian to collect more FMD outbreak samples and submit to National FMD Lab
Poor Quality of FMD Sample	• Improve staff skill • Apply molecular methods
Reporting and Sharing information	• Strengthen official reporting system and surveillance

Future research plans

JICA-LBVD Project : The Project for Improvement of Foot and Mouth Disease Control (2019-2024)

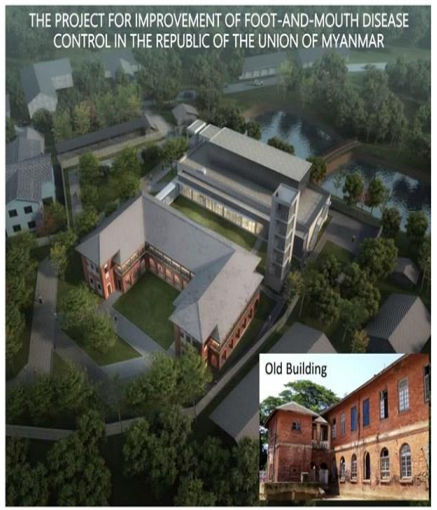
Project Purpose :

Control system for FMD epidemics is strengthened in National FMD Laboratory in Yangon and in the pilot sites in Project areas

Project sites:

Yangon FMD Laboratory, Naypyitaw BSL2 FMD diagnostic Laboratory, Regional Veterinary Diagnostic Laboratory

Output 1 : Mass Production of FMD Vaccine
Output 2: Rapid diagnosis & Epidemiological survey
Output 3: Strengthened Vet Services in the pilot sites & Networking among the institutions



Future research plans

FMD Active Surveillance and Questionnaire activities

Objectives: To understand FMD prevalence, distribution, risk and economic impact at target townships

Study Area : Magway

Naypyitaw

Sagaing

Rakhine

Tanintharyi

Kayin

Future research plans

- **OIE-LBVD Myanmar FMD Control Project (2016-2020)**
  - PVM study testing by LPB ELISA
  - 7th round Vaccination Campaign
  - Farmer/Trader FMD Awareness Training

- **Revising the National Strategy Framework on Foot and Mouth Control Myanmar with OIE and LBVD**
- **Cooperate with KOICA for technical exchange (SURVEILLANCE AND DIAGNOSIS DEVELOPMENT OF FOOT AND MOUTH DISEASE IN MYANMAR)**
- **Increase follow up outbreak investigation to understand virus circulation**

Thank you for your Attention!