

Foot-and-mouth disease virus persistence in healthy Asian buffaloes

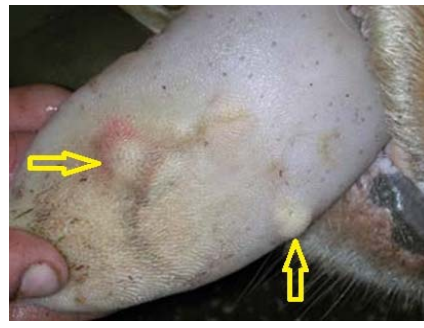
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FMD Clinical Signs



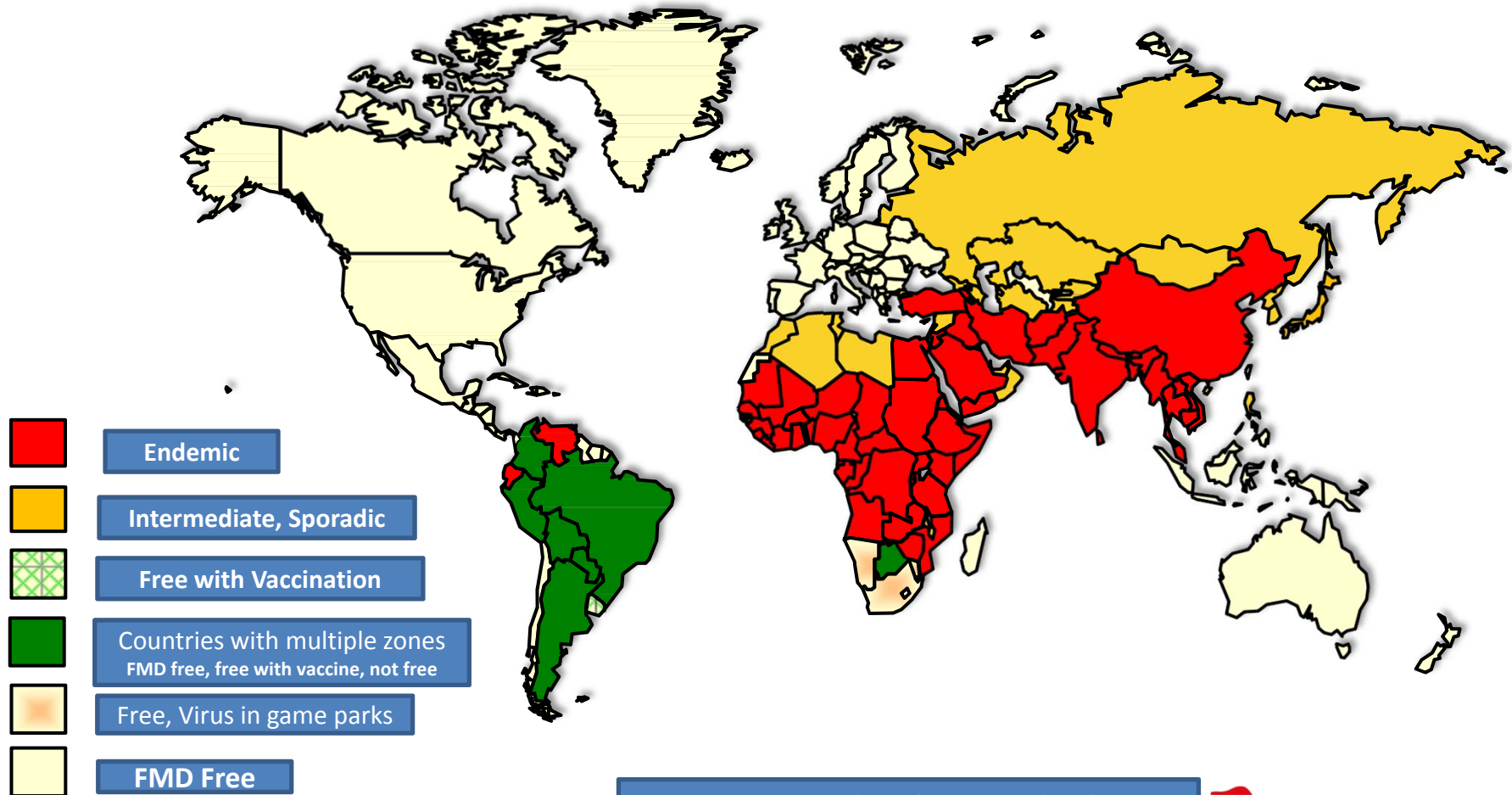
Economic losses of FMD

Losses/parameters		Locality	Ref
Milk losses	Pak. Rs. 10.2m	Pakistan	Kazimi and Shah, 1981
Body weight loss	Rs. 14.5m		
Annual loss (5% incidence)	Rs. 151m (bovine)	Pakistan	Upton and Shields, 1988
(30% incidence)	Rs. 910m		
loss/year to dairy industry	Rs. 6.00 bn	Pakistan	Zulfiqar, 2003 Farooq et al., 2017
Karachi (1m) (3.6% incidence)	Rs. 14.5 bn		
Annual Loss	US\$ 1230.32 m	India	Singh et al., 2007
Milk loss in first 60 days / animal	210 liters/animal	Pakistan	Ferrari et al., 2014 Farooq et al., 2017
45 days/animal	307.8 lit		
Prod losses & vaccination (endemic regions)	USD 6.5 & 21bn	China, India & Africa	Knight-Jones and Rushton, 2013



OIE

Conjectured Status of FMD



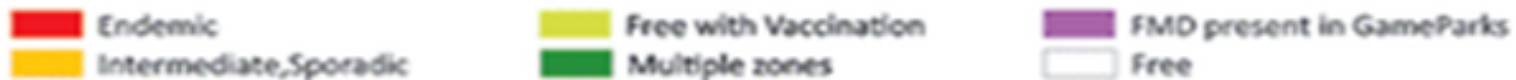
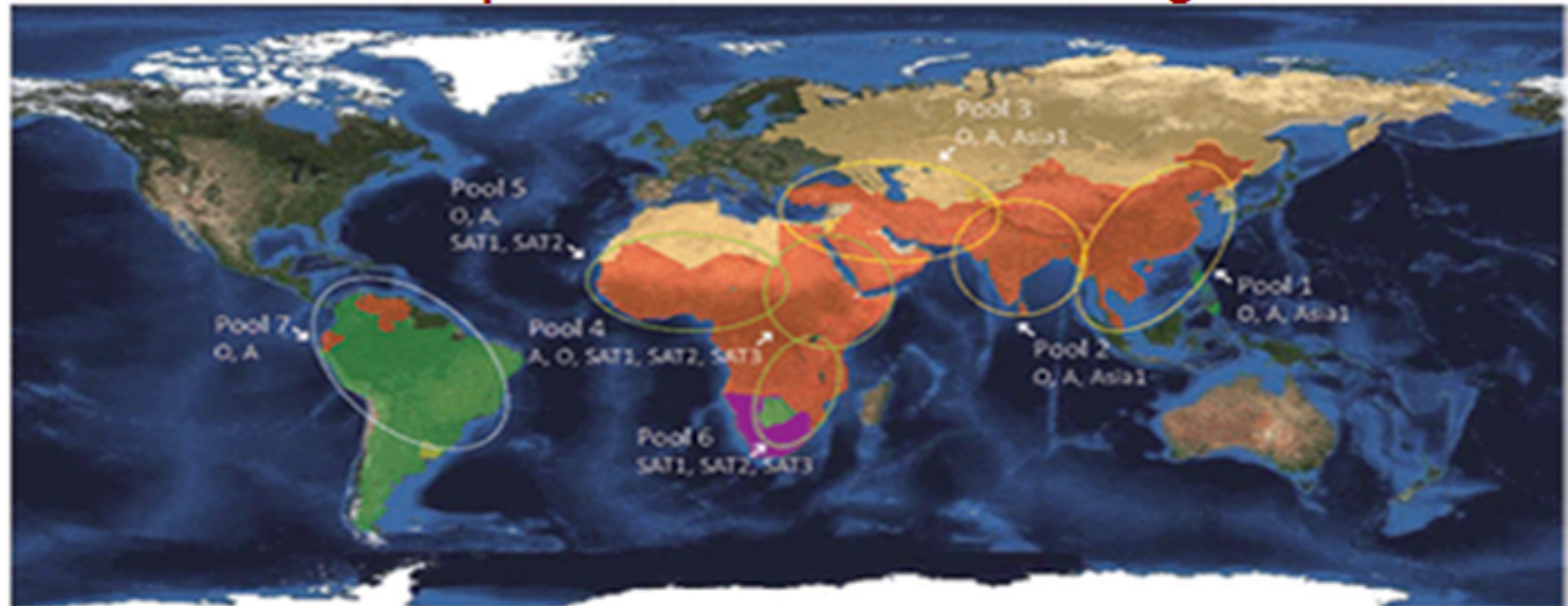
From: Hammond et al, WRL, Pirbright, UK





Progressive Control of FMD in Pakistan

FMDV Pool: Seven pools of FMD viruses circulating in the world



- P1: East Asian countries (O, A, Asia-1); P2: South Asian countries (O, A, Asia-1)
- P3: Euro-Asia region (O, A, Asia-1); P4: North East Africa (O, A, SAT-1,2,3)
- P5: North West Africa (O, A, SAT 1,2); P6: South East Africa (SAT-1,2,3)
- P7: South American countries (O,A)
- Pakistan: South Asia and Euro-Asia

Facts about livestock in Pakistan

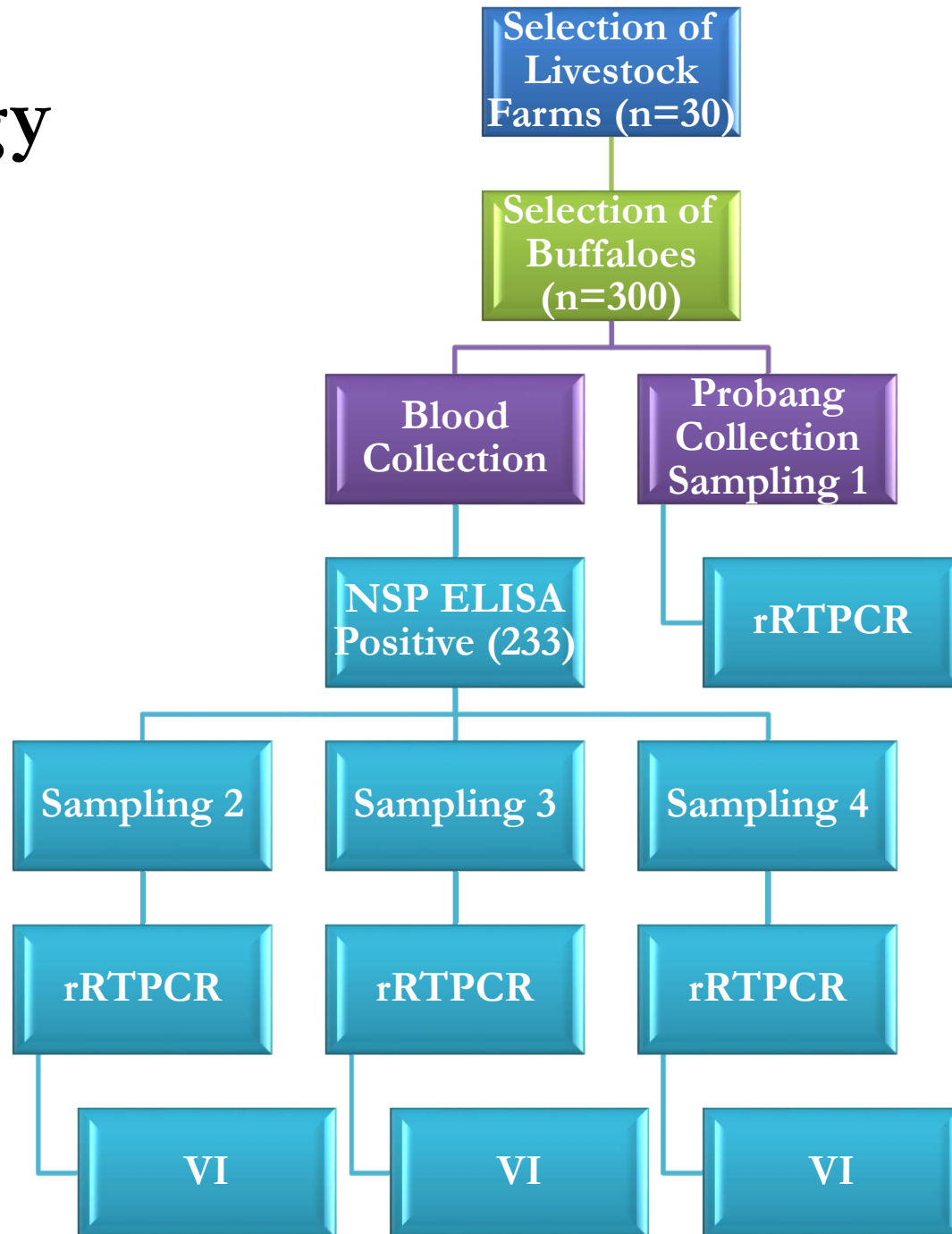
Agriculture value added contribution	58.3%
Overall GDP (2016-17)	11.4%
Families involved in livestock raising	8m (35%)

Livestock Population (Min. Nat. Food Sec. Res. 2016-17)	
Species	Million no.
Cattle	44.4
Buffalo	37.7
Sheep	30.1
Goat	72.2
Camel	1.1

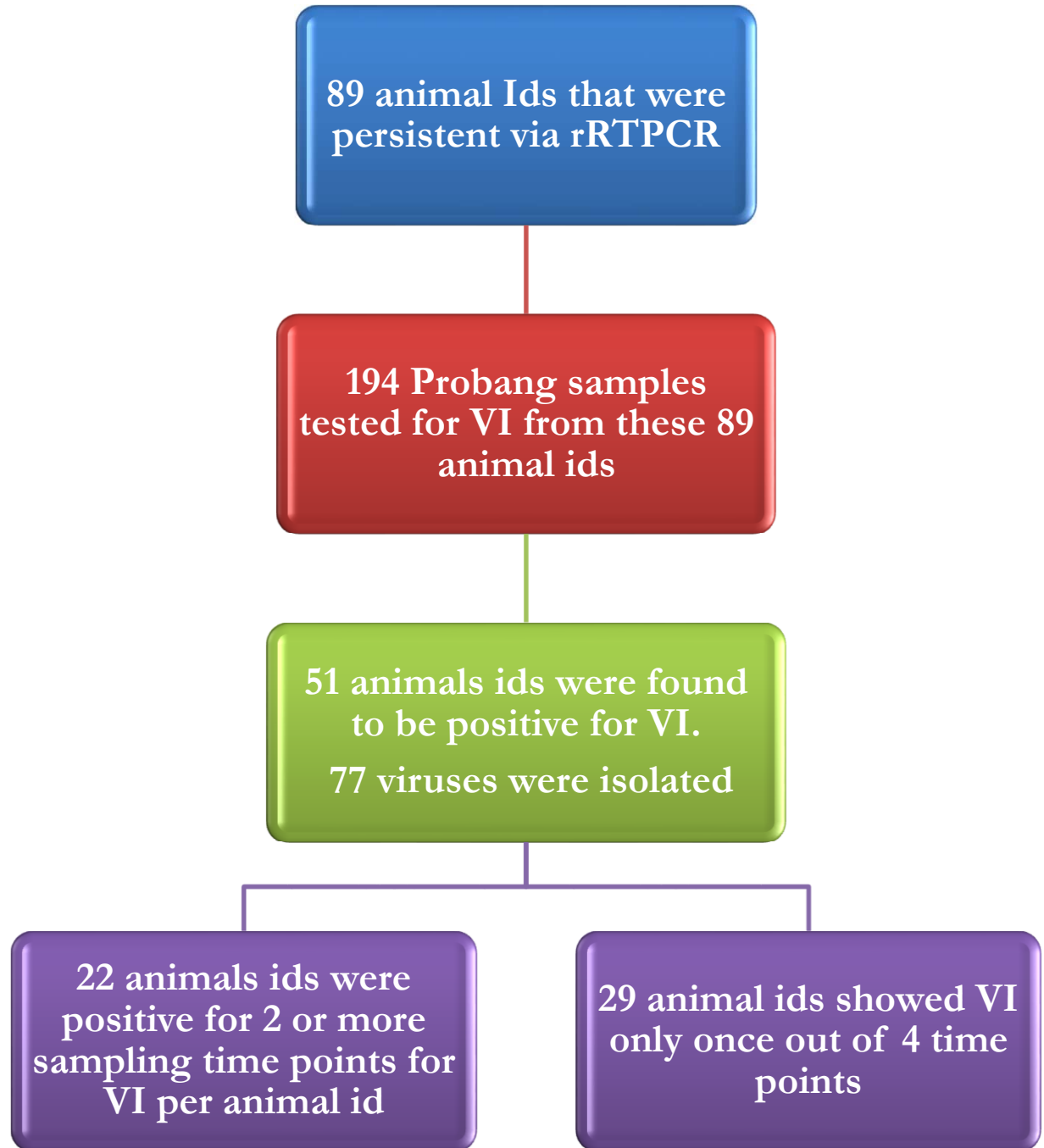
Research question to address ?

- Do FMDV persist in healthy vaccinated buffaloes?
- If yes, Which FMDV Serotypes?
- How long FMDV persists in these species?
- What is genetic relationship with circulating viruses?

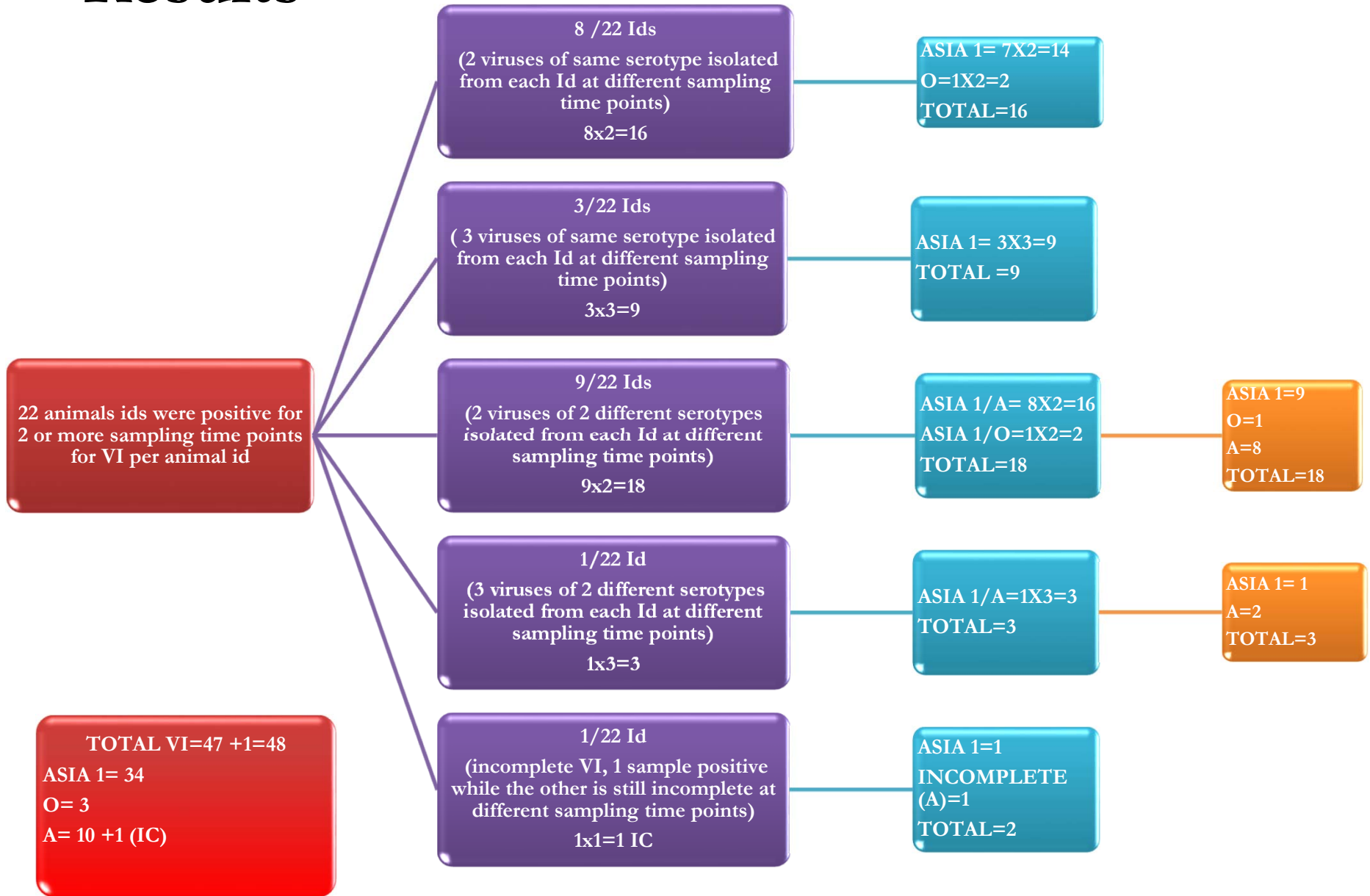
Methodology



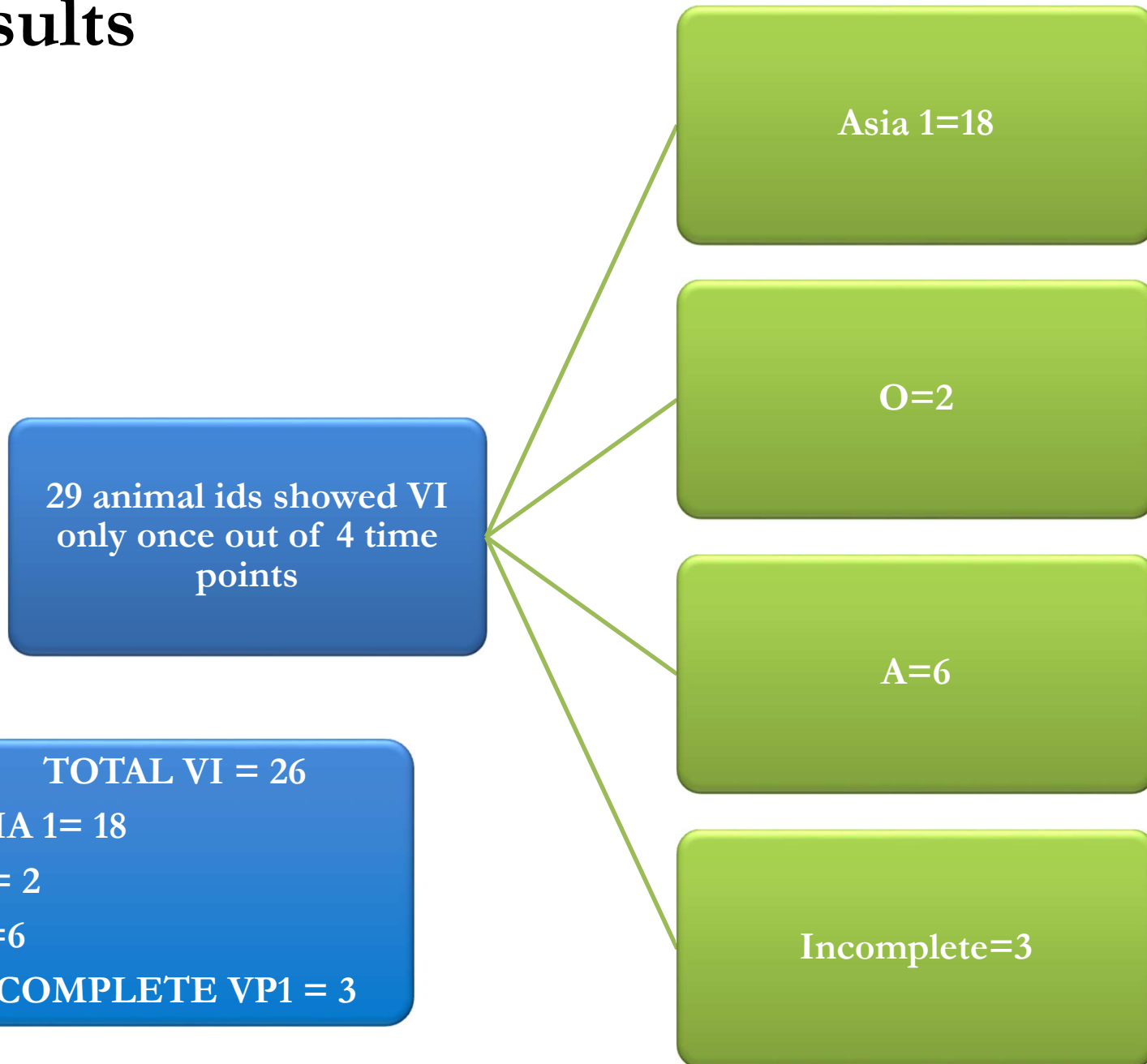
Results



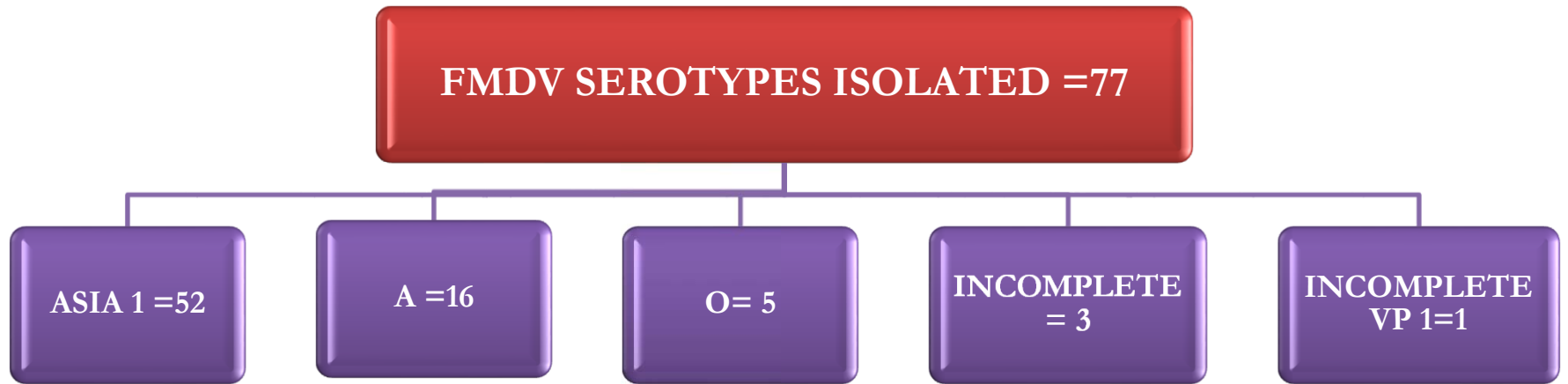
Results



Results

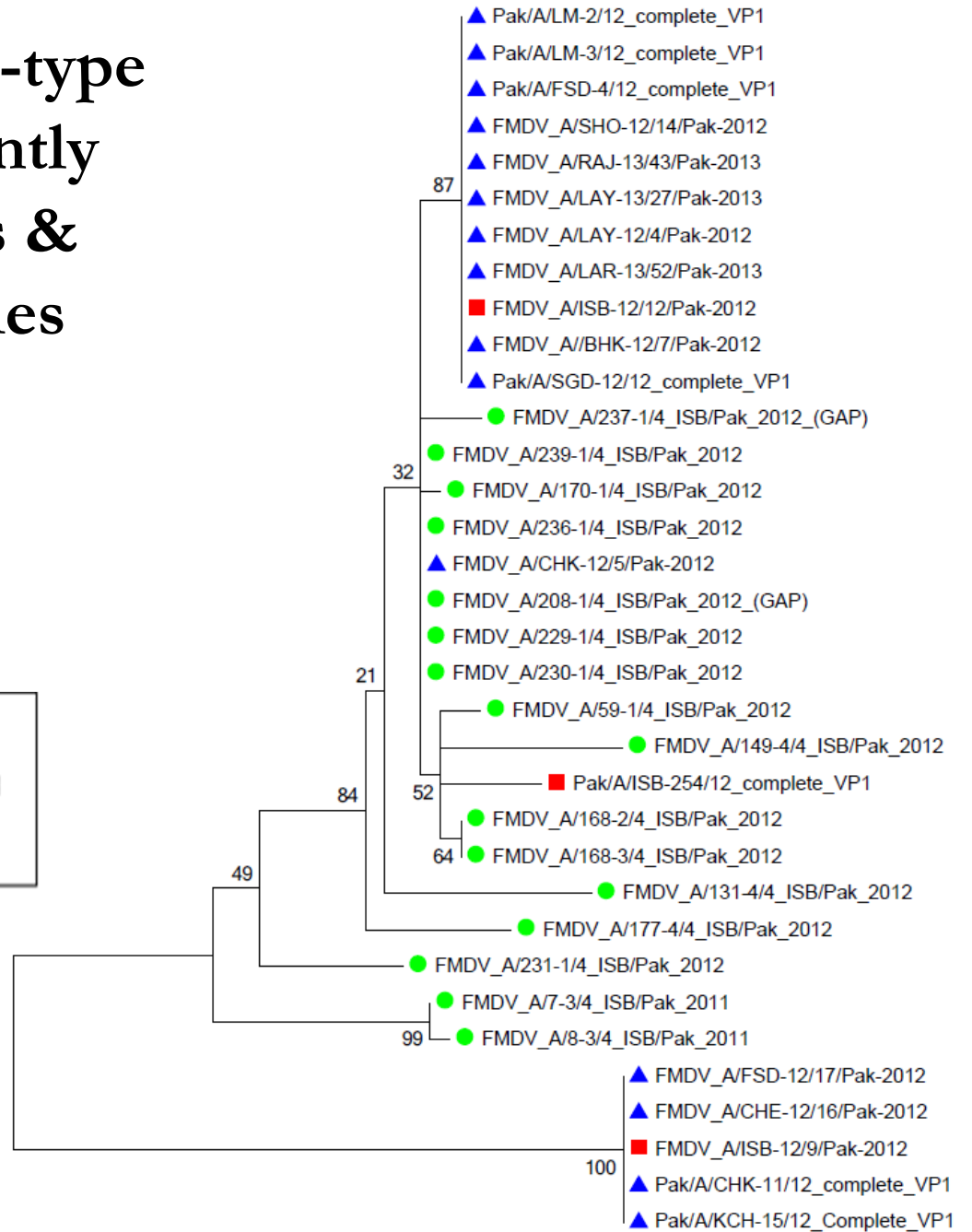


Results



Phylogeny of FMDV sero-type A isolated from persistently infected carrier animals & FMDV outbreak samples

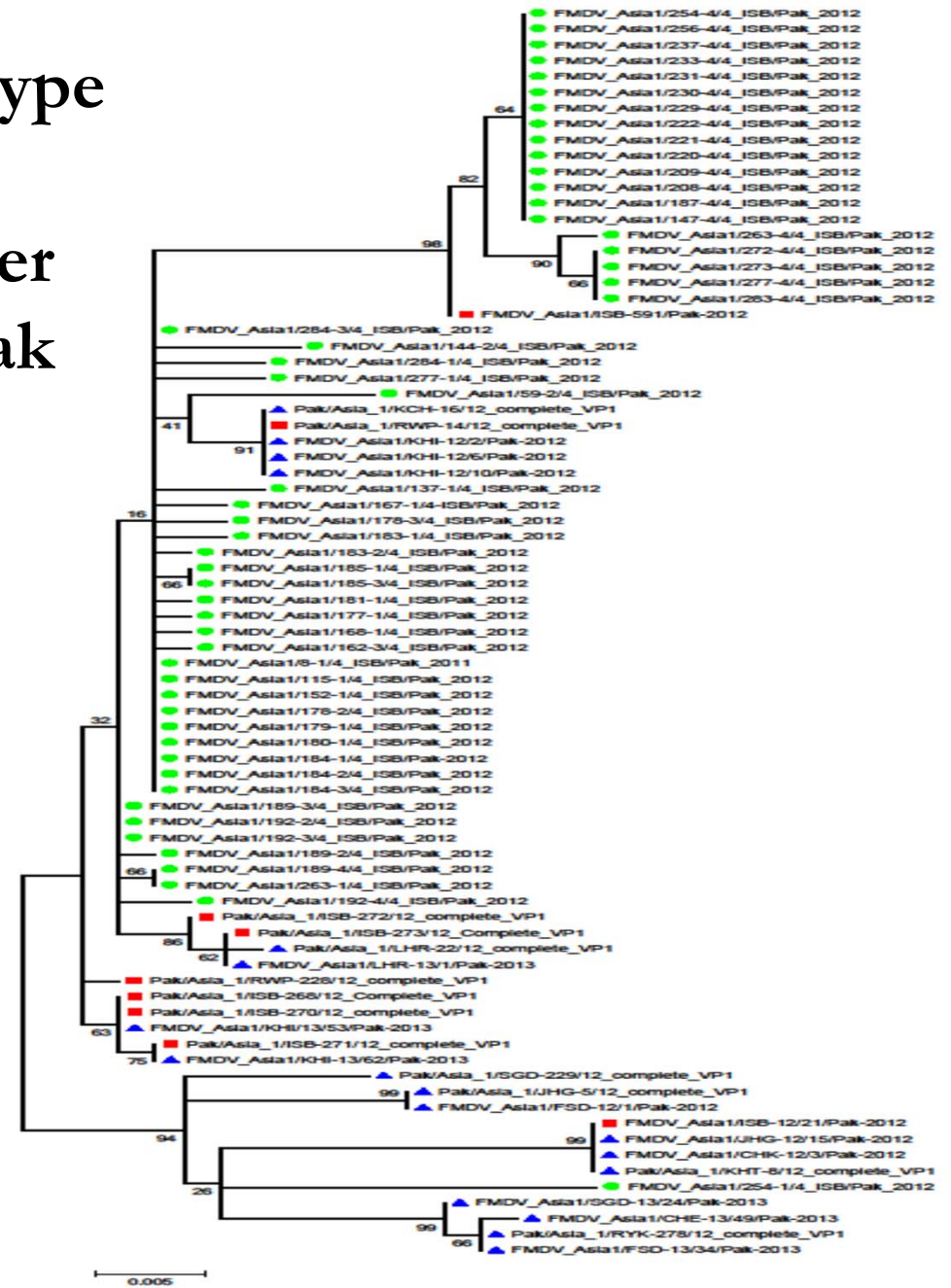
- ▲ Isolation from carrier animals
- Isolation from clinically infected animals other than Islamabad
- Isolation from clinically infected animals from Islamabad



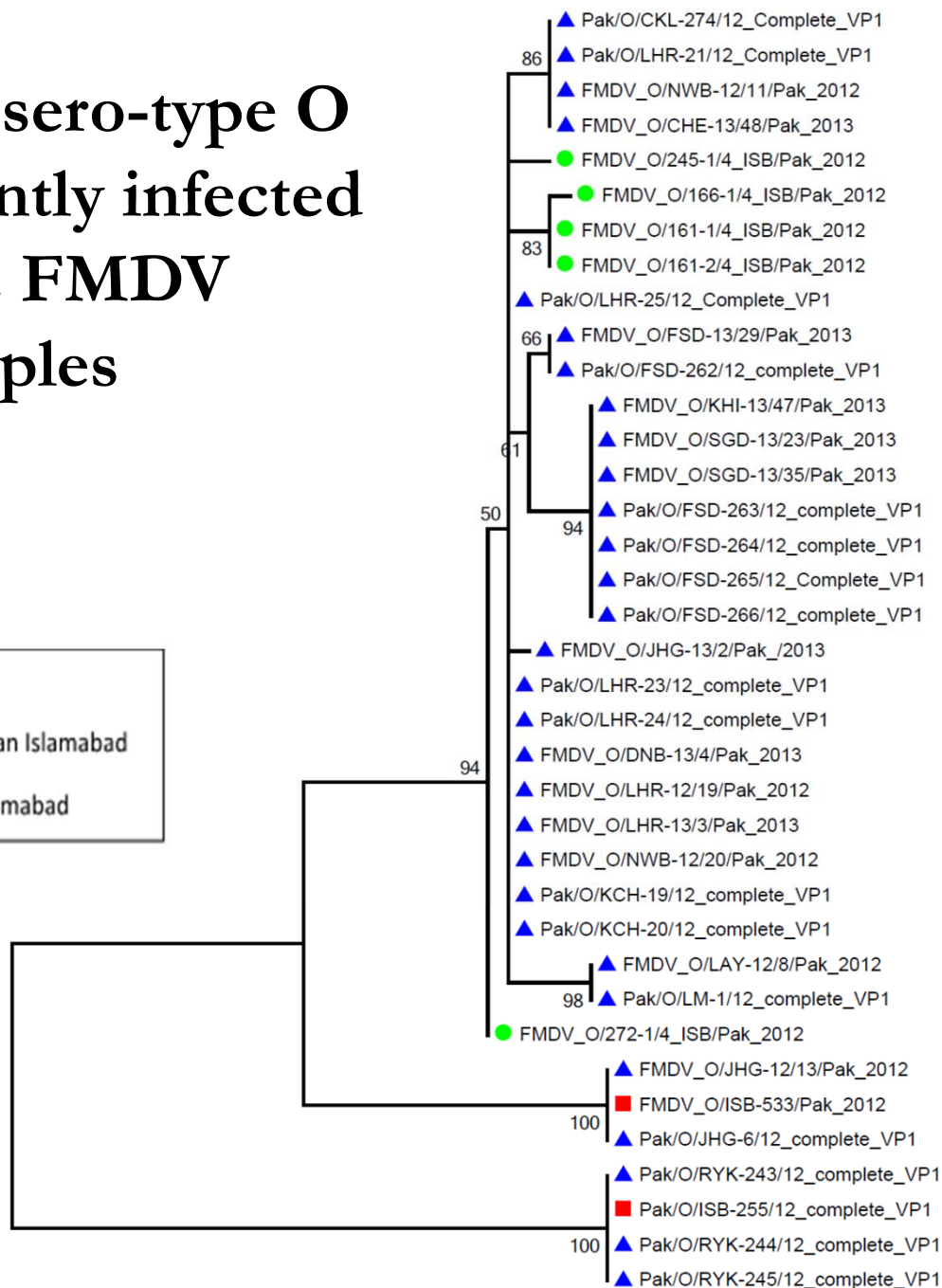
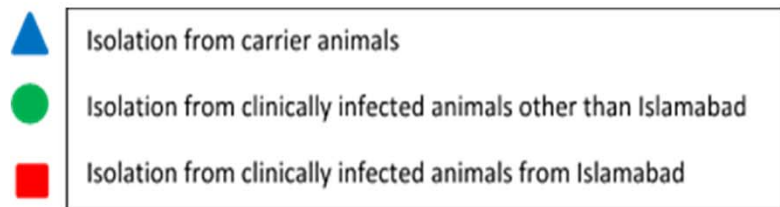
0.01

Phylogeny of FMDV sero-type Asia 1 isolated from persistently infected carrier animals & FMDV outbreak samples

- ▲ Isolation from carrier animals
- Isolation from clinically infected animals other than Islamabad
- Isolation from clinically infected animals from Islamabad



Phylogeny of FMDV sero-type O isolated from persistently infected carrier animals & FMDV outbreak samples



0.01

STATUS OF BUFFALOES

FMDV NSP	Probang (RT-PCR)	Animal Status	No. Animals
+	+	Infected/Carrier	167
-	-	Non-infected	48
+	-	non-carrier/previously infected	66
-	+	Not previously infected/carrier	19

FMDV control program & collaborative partners (Pakistan)



FAS for Financial Assistance, ARS (Dr. Luis Rodriguez, Dr. Zaheer Ahmed and Team) for research Collaboration



Animal Health Programme, PARC for research (Dr Khalid Naeem and team)



Team of GCP/PAK/123/USA Project Progressive Control of FMD in Pakistan (Dr. M. Afzal, Dr. Manzoor Hussain, Dr. Ehtisham Khan)



Animal Husbandry Commissioner Office, National Veterinary Labs, Islamabad



THANKS