

# FAO World Reference Laboratory for Foot-and-Mouth Disease (WRLFMD)

## Genotyping Report (Supplementary)

FMDV serotype: O  
Country: Cambodia  
Year: 2016  
Batch: WRLFMD/2017/00015  
No. of sequences: 3  
Report date: 27th July 2017  
Report generated by: Nick Knowles  
Report checked by: Kasia Bankowska

This report contains information on an additional type O virus identified in the sample CAM/2/2016 (which also contained a serotype A virus).



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Virus sample name:	CAM/1/2016
Sender reference:	CAM9/16R1
Location of origin:	Domreyslab, Tree commune, Kandalsteung, Kandal
Country of origin:	Cambodia
Date of collection:	02/12/2016
Host species:	
Serotype:	O
Topotype:	ME-SA
Lineage:	PanAsia
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1 05/07/2017 & RS1
Harvest date of material:	07/07/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/07/2017
Created:	21/07/2017
Last updated:	21/07/2017

VIBASys IDs: sample 34092, genome 34093, sequence viba\_34094, sequencing info 34095

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_34107	CAM/2/2016		99.8	0	O	ME-SA	PanAsia	
viba_22202	VIT/46/2013	cattle	96.7	0	O	ME-SA	PanAsia	
viba_22194	VIT/40/2013	cattle	96.7	0	O	ME-SA	PanAsia	
viba_22206	VIT/47/2013	cattle	96.7	0	O	ME-SA	PanAsia	
viba_23412	VIT/12/2014	cattle	96.5	0	O	ME-SA	PanAsia	
viba_22122	VIT/15/2013	cattle	96.5	0	O	ME-SA	PanAsia	
viba_22182	VIT/37/2013	cattle	96.5	1	O	ME-SA	PanAsia	
viba_22114	VIT/13/2013	cattle	96.5	0	O	ME-SA	PanAsia	
viba_23408	VIT/11/2014	cattle	96.5	0	O	ME-SA	PanAsia	
viba_23404	VIT/9/2014	cattle	96.4	0	O	ME-SA	PanAsia	

#### Most Closely Related Prototype Sequences

see [http://www.wrlfmd.org/fmd\\_genotyping/prototypes.htm](http://www.wrlfmd.org/fmd_genotyping/prototypes.htm)

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_285	UKG/35/2001	porcine	91.3	0	O	ME-SA	PanAsia	
viba_293	BHU/3/2009	cattle	89.7	0	O	ME-SA	Ind-2001	d
viba_705	KUW/3/97	bovine	89.6	0	O	ME-SA	Ind-2001	a
viba_541	OMN/7/2001	bovine	89.3	0	O	ME-SA	Ind-2001	b
viba_650	IRN/8/2005	ovine	88.9	0	O	ME-SA	PanAsia-2	
viba_491	TUR/257/2008		88.8	0	O	ME-SA	PanAsia-2	TER-08
viba_397	UAE/4/2008	gazelle	88.8	0	O	ME-SA	Ind-2001	c
viba_766	IRN/31/2009	cattle	88.6	0	O	ME-SA	PanAsia-2	FAR-09
viba_505	TUR/264/2009		88.5	0	O	ME-SA	PanAsia-2	SAN-09
viba_860	IRN/6/2015	cattle	88.2	0	O	ME-SA	PanAsia-2	QOM-15

Virus sample name:	CAM/2/2016
Sender reference:	CAM10/16R1B2
Location of origin:	Domreyslab, Tree commune, Kandalsteung, Kandal
Country of origin:	Cambodia
Date of collection:	02/12/2016
Host species:	
Serotype:	O
Topotype:	ME-SA
Lineage:	PanAsia
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1 05/07/2017 & RS1
Harvest date of material:	05/07/2017
Primers:	A-1C562F/EUR-2B52R; A-1C612F/EUR-2B52R
Received for sequencing:	19/07/2017
Created:	21/07/2017
Last updated:	21/07/2017

VIBASys IDs: sample 34080, genome 34106, sequence viba\_34107, sequencing info 34108

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_34094	CAM/1/2016		99.8	0	O	ME-SA	PanAsia	
viba_22202	VIT/46/2013	cattle	96.5	0	O	ME-SA	PanAsia	
viba_22194	VIT/40/2013	cattle	96.5	0	O	ME-SA	PanAsia	
viba_22206	VIT/47/2013	cattle	96.5	0	O	ME-SA	PanAsia	
viba_23412	VIT/12/2014	cattle	96.4	0	O	ME-SA	PanAsia	
viba_22122	VIT/15/2013	cattle	96.4	0	O	ME-SA	PanAsia	
viba_22182	VIT/37/2013	cattle	96.4	1	O	ME-SA	PanAsia	
viba_22114	VIT/13/2013	cattle	96.4	0	O	ME-SA	PanAsia	
viba_23408	VIT/11/2014	cattle	96.4	0	O	ME-SA	PanAsia	
viba_23404	VIT/9/2014	cattle	96.2	0	O	ME-SA	PanAsia	

#### Most Closely Related Prototype Sequences

see [http://www.wrlfmd.org/fmd\\_genotyping/prototypes.htm](http://www.wrlfmd.org/fmd_genotyping/prototypes.htm)

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_285	UKG/35/2001	porcine	91.2	0	O	ME-SA	PanAsia	
viba_293	BHU/3/2009	cattle	89.6	0	O	ME-SA	Ind-2001	d
viba_705	KUW/3/97	bovine	89.4	0	O	ME-SA	Ind-2001	a
viba_541	OMN/7/2001	bovine	89.1	0	O	ME-SA	Ind-2001	b
viba_650	IRN/8/2005	ovine	88.8	0	O	ME-SA	PanAsia-2	
viba_491	TUR/257/2008		88.6	0	O	ME-SA	PanAsia-2	TER-08
viba_397	UAE/4/2008	gazelle	88.6	0	O	ME-SA	Ind-2001	c
viba_766	IRN/31/2009	cattle	88.5	0	O	ME-SA	PanAsia-2	FAR-09
viba_505	TUR/264/2009		88.3	0	O	ME-SA	PanAsia-2	SAN-09
viba_860	IRN/6/2015	cattle	88.0	0	O	ME-SA	PanAsia-2	QOM-15

Virus sample name:	CAM/3/2016
Sender reference:	CAM21/16R1
Location of origin:	Domreyslab, Tree commune, Kandalsteung, Kandal
Country of origin:	Cambodia
Date of collection:	02/12/2016
Host species:	
Serotype:	O
Topotype:	ME-SA
Lineage:	PanAsia
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1 05/07/2017 & RS1
Harvest date of material:	05/07/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/07/2017
Created:	21/07/2017
Last updated:	21/07/2017
VIBASys IDs: sample 34096, genome 34097, sequence viba_34098, sequencing info 34099	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_16291	VIT/7/2010	cattle	96.5	0	O	ME-SA	PanAsia	
viba_33753	MOG/2/2017	cattle	96.5	0	O	ME-SA	PanAsia	
viba_33749	MOG/1/2017	cattle	96.5	0	O	ME-SA	PanAsia	
viba_33761	MOG/10/2017	cattle	96.5	0	O	ME-SA	PanAsia	
viba_20160	VIT/3/2012	porcine	96.5	0	O	ME-SA	PanAsia	
viba_20164	VIT/4/2012	porcine	96.5	0	O	ME-SA	PanAsia	
viba_16320	VIT/14/2010	cattle	96.5	0	O	ME-SA	PanAsia	
viba_18776	VIT/16/2011	water buffalo	96.5	0	O	ME-SA	PanAsia	
viba_18736	VIT/6/2011	water buffalo	96.5	0	O	ME-SA	PanAsia	
viba_20180	VIT/8/2012	porcine	96.5	0	O	ME-SA	PanAsia	

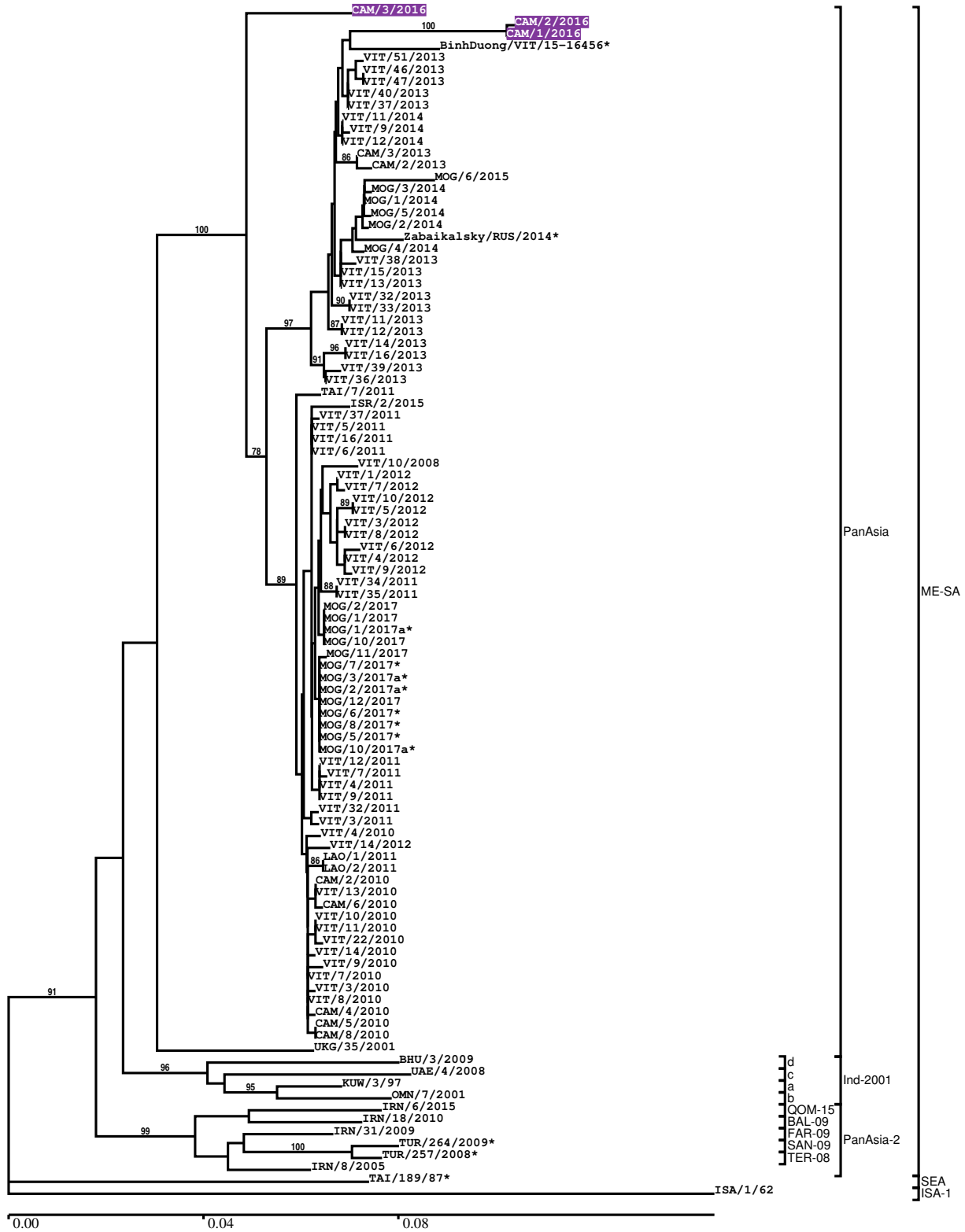
#### Most Closely Related Prototype Sequences

see [http://www.wrlfmd.org/fmd\\_genotyping/prototypes.htm](http://www.wrlfmd.org/fmd_genotyping/prototypes.htm)

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_285	UKG/35/2001	porcine	92.7	0	O	ME-SA	PanAsia	
viba_705	KUW/3/97	bovine	91.3	0	O	ME-SA	Ind-2001	a
viba_650	IRN/8/2005	ovine	91.0	0	O	ME-SA	PanAsia-2	
viba_541	OMN/7/2001	bovine	90.7	0	O	ME-SA	Ind-2001	b
viba_766	IRN/31/2009	cattle	90.5	0	O	ME-SA	PanAsia-2	FAR-09
viba_293	BHU/3/2009	cattle	90.1	0	O	ME-SA	Ind-2001	d
viba_666	IRN/18/2010	cattle	90.0	0	O	ME-SA	PanAsia-2	BAL-09
viba_491	TUR/257/2008		89.9	0	O	ME-SA	PanAsia-2	TER-08
viba_505	TUR/264/2009		89.9	0	O	ME-SA	PanAsia-2	SAN-09
viba_860	IRN/6/2015	cattle	89.9	0	O	ME-SA	PanAsia-2	QOM-15

Report on FMDV O in Cambodia in 2016

Batch: WRLFMD/2017/00015



\*, not a WRLFMD Reference Number

## Analysis Parameters

VP1 subsequence extractor:	vp1_O
Query sequence set:	WRLFMD/2017/00015-Cambodia-O (3 sequences)
Sequence database set:	allseqs_O (3555 sequences)
Prototype sequence set:	!prototypes_O (47 sequences)
Number of related sequences reported:	10
Minimal VP1 subsequence match length	600
Sequence alignment method:	muscle (default parameters)
Sequence alignment length:	636
Phylogeny reconstruction method:	fdnadist, fneighbor
Number of bootstrap samples:	1000
Random seed for bootstrapping:	1
Displaying bootstrap values above:	70.0%
Number of sequences in tree capped at:	100
Number of prototype sequences in tree:	11
VIBASys version:	master-1.1.0-17-gf69a4d1

## Sequences in the Phylogenetic Tree

All sequences in the tree are in taxonomic group FMDV/O

label	accession	host(s)	lab	country	taxonomic information
CAM/3/2016	n/a	n/a	WRLFMD	Cambodia	ME-SA/PanAsia
CAM/2/2016	n/a	n/a	WRLFMD	Cambodia	ME-SA/PanAsia
CAM/1/2016	n/a	n/a	WRLFMD	Cambodia	ME-SA/PanAsia
BinhDuong/VIT/15-16456*	n/a	water buffalo	RAHO6	Vietnam	ME-SA/PanAsia
VIT/51/2013	KY492073	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/46/2013	KX944731	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/47/2013	KY492072	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/40/2013	KX944729	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/37/2013	KX944727	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/11/2014	KX944733	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/9/2014	KX944732	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/12/2014	KY492074	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
CAM/3/2013	n/a	cattle	WRLFMD	Cambodia	ME-SA/PanAsia
CAM/2/2013	n/a	cattle	WRLFMD	Cambodia	ME-SA/PanAsia
MOG/6/2015	n/a	cattle	WRLFMD	Mongolia	ME-SA/PanAsia
MOG/3/2014	n/a	cattle	WRLFMD	Mongolia	ME-SA/PanAsia
MOG/1/2014	n/a	cattle	WRLFMD	Mongolia	ME-SA/PanAsia
MOG/5/2014	n/a	cattle	WRLFMD	Mongolia	ME-SA/PanAsia
MOG/2/2014	n/a	cattle	WRLFMD	Mongolia	ME-SA/PanAsia
Zabaikalsky/RUS/2014*	n/a	cattle	ARRIAH	Russia	ME-SA/PanAsia
MOG/4/2014	n/a	cattle	WRLFMD	Mongolia	ME-SA/PanAsia
VIT/38/2013	KY492071	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/15/2013	KX944717	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/13/2013	KX944715	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/32/2013	KX944725	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/33/2013	KY492070	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/11/2013	KX944714	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/12/2013	KY492065	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/14/2013	KX944716	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/16/2013	KX944718	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/39/2013	KX944728	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/36/2013	KX944726	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
TAI/7/2011	n/a	cattle	WRLFMD	Thailand	ME-SA/PanAsia
ISR/2/2015	n/a	porcine	WRLFMD	Israel	ME-SA/PanAsia
VIT/37/2011	n/a	water buffalo	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/5/2011	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia

*continued on next page*

label	accession	host(s)	lab	country	taxonomic information
VIT/16/2011	n/a	water buffalo	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/6/2011	n/a	water buffalo	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/10/2008	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/1/2012	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/7/2012	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/10/2012	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/5/2012	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/3/2012	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/8/2012	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/6/2012	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/4/2012	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/9/2012	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/34/2011	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/35/2011	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
MOG/2/2017	n/a	cattle	WRLFMD	Mongolia	ME-SA/PanAsia
MOG/1/2017	n/a	cattle	WRLFMD	Mongolia	ME-SA/PanAsia
MOG/1/2017a*	n/a	cattle	ARRIAH	Mongolia	ME-SA/PanAsia
MOG/10/2017	n/a	cattle	WRLFMD	Mongolia	ME-SA/PanAsia
MOG/11/2017	n/a	cattle	WRLFMD	Mongolia	ME-SA/PanAsia
MOG/7/2017*	n/a	gazelle	ARRIAH	Mongolia	ME-SA/PanAsia
MOG/3/2017a*	n/a	cattle	ARRIAH	Mongolia	ME-SA/PanAsia
MOG/2/2017a*	n/a	cattle	ARRIAH	Mongolia	ME-SA/PanAsia
MOG/12/2017	n/a	cattle	WRLFMD	Mongolia	ME-SA/PanAsia
MOG/6/2017*	n/a	gazelle	ARRIAH	Mongolia	ME-SA/PanAsia
MOG/8/2017*	n/a	cattle	ARRIAH	Mongolia	ME-SA/PanAsia
MOG/5/2017*	n/a	cattle	ARRIAH	Mongolia	ME-SA/PanAsia
MOG/10/2017a*	n/a	cattle	ARRIAH	Mongolia	ME-SA/PanAsia
VIT/12/2011	n/a	water buffalo	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/7/2011	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/4/2011	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/9/2011	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/32/2011	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/3/2011	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/4/2010	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/14/2012	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
LAO/1/2011	n/a	water buffalo	WRLFMD	Laos	ME-SA/PanAsia
LAO/2/2011	n/a	water buffalo	WRLFMD	Laos	ME-SA/PanAsia
CAM/2/2010	n/a	cattle	WRLFMD	Cambodia	ME-SA/PanAsia
VIT/13/2010	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
CAM/6/2010	n/a	cattle	WRLFMD	Cambodia	ME-SA/PanAsia
VIT/10/2010	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/11/2010	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/22/2010	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/14/2010	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/9/2010	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/7/2010	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/3/2010	n/a	porcine	WRLFMD	Vietnam	ME-SA/PanAsia
VIT/8/2010	n/a	cattle	WRLFMD	Vietnam	ME-SA/PanAsia
CAM/4/2010	n/a	n/a	WRLFMD	Cambodia	ME-SA/PanAsia
CAM/5/2010	n/a	n/a	WRLFMD	Cambodia	ME-SA/PanAsia
CAM/8/2010	n/a	cattle	WRLFMD	Cambodia	ME-SA/PanAsia
UKG/35/2001	AJ539141	porcine	PIADC	United Kingdom	ME-SA/PanAsia
BHU/3/2009	KM921814	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
UAE/4/2008	KM921876	gazelle	WRLFMD	United Arab Emirates	ME-SA/Ind-2001/c
KUW/3/97	DQ164904	bovine	WRLFMD	Kuwait	ME-SA/Ind-2001/a
OMN/7/2001	DQ164941	bovine	WRLFMD	Oman	ME-SA/Ind-2001/b
IRN/6/2015	n/a	cattle	WRLFMD	Iran	ME-SA/PanAsia-2/QOM-15
IRN/18/2010	KY091283	cattle	WRLFMD	Iran	ME-SA/PanAsia-2/BAL-09
IRN/31/2009	KY091284	cattle	WRLFMD	Iran	ME-SA/PanAsia-2/FAR-09
TUR/264/2009*	n/a	n/a	FMDI-Ankara	Turkey	ME-SA/PanAsia-2/SAN-09
TUR/257/2008*	n/a	n/a	FMDI-Ankara	Turkey	ME-SA/PanAsia-2/TER-08
IRN/8/2005	KY091281	ovine	WRLFMD	Iran	ME-SA/PanAsia-2
TAI/189/87*	KY091288	bovine	TRRL	Thailand	SEA
ISA/1/62	AJ303500	n/a	WRLFMD	Indonesia	ISA-1

\*, not a WRLFMD Reference Number  
n/a, not available