Antigenic characteristics available between strains of HPAI H5N1 virus for predicting antigenic variant

Part I Archetti-Horsfall distance between viral strains.

Strain1	Strain2	dAH	Variant or not
A/Teal/HongKong/2978.1/2002	A/HongKong/213/2003	2.828	0
A/Teal/HongKong/2978.1/2002	A/Goose/HongKong/739.2/2002	4	1
A/Turkey/Turkey/1/2005	A/Egret/Egypt/1162-NAMRU3/2006	1.414	0
A/Turkey/Turkey/1/2005	A/Egypt/3300-NAMRU3/2008	196	1
A/Turkey/Turkey/1/2005	A/Bar-headedGoose/Qinghai/1A/2005	2	0
A/Turkey/Turkey/1/2005	A/Egypt/4226-NAMRU3/2007	1.414	0
A/Turkey/Turkey/1/2005	A/Egypt/1394-NAMRU3/2007	2	0
A/Turkey/Turkey/1/2005	A/Egypt/0215-NAMRU3/2007	2.828	0
A/Turkey/Turkey/1/2005	A/Anhui/1/2005	22.627	1
A/Turkey/Turkey/1/2005	A/Egypt/N03072/2010	2	0
A/Turkey/Turkey/1/2005	A/Chicken/Egypt/9403-NAMRU3/2007	64	1
A/Turkey/Turkey/1/2005	A/Egypt/2321-NAMRU3/2007	3	0
A/Turkey/Turkey/1/2005	A/Turkey/65-596/2006	1	0
A/Turkey/Turkey/1/2005	A/Egypt/2786-NAMRU3/2006	2.828	0
A/Egret/Egypt/1162-NAMRU3/2006	A/Egypt/3300-NAMRU3/2008	64	1
A/Egret/Egypt/1162-NAMRU3/2006	A/Egypt/0215-NAMRU3/2007	1.414	0
A/Egret/Egypt/1162-NAMRU3/2006	A/Egypt/1394-NAMRU3/2007	2	0
A/Egret/Egypt/1162-NAMRU3/2006	A/Egypt/4226-NAMRU3/2007	0.5	0
A/Egret/Egypt/1162-NAMRU3/2006	A/Anhui/1/2005	32	1
A/Egret/Egypt/1162-NAMRU3/2006	A/Chicken/Egypt/9403-NAMRU3/2007	16	1
A/Egret/Egypt/1162-	A/Egypt/2321-NAMRU3/2007	1	0

NAMRU3/2006			
A/Duck/Hunan/15/2004	A/Anhui/1/2005	2	0
A/Vietnam/1203/2004	A/Egret/Egypt/1162-NAMRU3/2006	32	1
A/Vietnam/1203/2004	A/Duck/Hunan/15/2004	1.414	0
A/Vietnam/1203/2004	A/Vietnam/Jp4207/2005	1	0
A/Vietnam/1203/2004	A/Turkey/65-596/2006	109.255	1
A/Vietnam/1203/2004	A/Egypt/3300-NAMRU3/2008	72	1
A/Vietnam/1203/2004	A/Guangxi/1/2005	11.314	1
A/Vietnam/1203/2004	A/Chicken/India/Niv-33487/2006	32	1
A/Vietnam/1203/2004	A/Duck/Hunan/795/2002	16.3135	1
A/Vietnam/1203/2004	A/Egypt/1394-NAMRU3/2007	64	1
A/Vietnam/1203/2004	A/Chicken/Korea/Gimje/2008	64	1
A/Vietnam/1203/2004	A/MuscovyDuck/Vietnam/1455/2006	8	1
A/Vietnam/1203/2004	A/Thailand/16/2004	3.3285	0
A/Vietnam/1203/2004	A/Goose/Guiyang/337/2006	8	1
A/Vietnam/1203/2004	A/Vietnam/Jp178/2004	1	0
A/Vietnam/1203/2004	A/Indonesia/Cdc625/2006	8	1
A/Vietnam/1203/2004	A/CommonMagpie/HongKong/645/2006	2.828	0
A/Vietnam/1203/2004	A/Vietnam/Jp14/2005	1	0
A/Indonesia/Cdc357/2006	A/WhooperSwan/Mongolia/244/2005	8	1
A/Indonesia/Cdc357/2006	A/Duck/Hunan/15/2004	16	1
A/Indonesia/Cdc357/2006	A/Guangxi/1/2005	32	1
A/Indonesia/Cdc357/2006	A/Bar-headedGoose/Qinghai/1A/2005	5.657	1
A/Indonesia/Cdc357/2006	A/Indonesia/Cdc625/2006	16	1
A/Vietnam/1194/2004	A/WhooperSwan/Mongolia/244/2005	11.314	1
A/Vietnam/1194/2004	A/Indonesia/5/2005	11.314	1
A/Vietnam/1194/2004	A/Vietnam/1203/2004	1.414	0
A/Vietnam/1194/2004	A/Bar-	11.31	1

	headedGoose/Qinghai/1A/2005	4	
A/Egypt/9539-NAMRU3/2009	A/Egypt/1394-NAMRU3/2007	1	0
A/Goose/Vietnam/113/2001	A/Teal/HongKong/2978.1/2002	4	1
A/Goose/Vietnam/113/2001	A/HongKong/213/2003	2.828	0
A/Goose/Vietnam/113/2001	A/Goose/HongKong/739.2/2002	4	1
A/Vietnam/Jp4207/2005	A/Vietnam/Jp14/2005	2	0
A/Turkey/65-596/2006	A/Egret/Egypt/1162-NAMRU3/2006	0.707	0
A/Turkey/65-596/2006	A/Goose/Guiyang/337/2006	45.255	1
A/Turkey/65-596/2006	A/Chicken/Vietnam/Ncvd-016/2008	45.255	1
A/Turkey/65-596/2006	A/Egypt/3300-NAMRU3/2008	64	1
A/Turkey/65-596/2006	A/Bar-headedGoose/Qinghai/1A/2005	1	0
A/Turkey/65-596/2006	A/Chicken/India/Niv-33487/2006	1.414	0
A/Turkey/65-596/2006	A/Egypt/4226-NAMRU3/2007	1.414	0
A/Turkey/65-596/2006	A/Egypt/1394-NAMRU3/2007	2	0
A/Turkey/65-596/2006	A/Egypt/0215-NAMRU3/2007	2	0
A/Turkey/65-596/2006	A/Anhui/1/2005	24	1
A/Turkey/65-596/2006	A/Chicken/Korea/Gimje/2008	5.657	1
A/Turkey/65-596/2006	A/Chicken/Egypt/9403-NAMRU3/2007	8	1
A/Turkey/65-596/2006	A/Egypt/2321-NAMRU3/2007	1.414	0
A/Turkey/65-596/2006	A/Egypt/2786-NAMRU3/2006	1.414	0
A/Turkey/65-596/2006	A/JapaneseWhiteEye/HongKong/1038/2006	90.51	1
A/CommonMagpie/HongKong/5052/2007	A/HongKong/6841/2010	2	0
A/CommonMagpie/HongKong/5052/2007	A/Bar-headedGoose/Mongolia/x53/2009	1.414	0
A/CommonMagpie/HongKong/5052/2007	A/GreyHeron/HongKong/1046/2008	2	0
A/Goose/HongKong/739.2/2002	A/HongKong/213/2003	1.414	0
A/Chicken/India/Niv-33487/2006	A/Goose/Guiyang/337/2006	45.255	1
A/Chicken/India/Niv-33487/2006	A/Anhui/1/2005	43.3135	1
A/Chicken/India/Niv-33487/2006	A/Chicken/Vietnam/Ncvd-	32	1

	016/2008		
A/Chicken/India/Niv-33487/2006	A/Chicken/Korea/Gimje/2008	16	1
A/Chicken/India/Niv-33487/2006	A/JapaneseWhiteEye/HongKong/1038/2006	3.414	0
A/Egypt/4226-NAMRU3/2007	A/Egypt/1394-NAMRU3/2007	3.4	0
A/Egypt/4226-NAMRU3/2007	A/Egypt/0215-NAMRU3/2007	2	0
A/Egypt/4226-NAMRU3/2007	A/Anhui/1/2005	22.627	1
A/Egypt/4226-NAMRU3/2007	A/Egypt/9539-NAMRU3/2009	4	1
A/Anhui/1/2005	A/Goose/Guiyang/337/2006	32	1
A/Anhui/1/2005	A/Guangxi/1/2005	1.414	0
A/Anhui/1/2005	A/Duck/Laos/3295/2006	1.207	0
A/Anhui/1/2005	A/JapaneseWhiteEye/HongKong/1038/2006	2	0
A/HongKong/213/2003	A/Vietnam/Jp30321/2005	8	1
A/HongKong/213/2003	A/Vietnam/Jp4207/2005	11.314	1
A/HongKong/213/2003	A/Vietnam/Jp14/2005	5.657	1
A/Egypt/N03072/2010	A/Egypt/3300-NAMRU3/2008	362.039	1
A/Duck/Laos/3295/2006	A/JapaneseWhiteEye/HongKong/1038/2006	2.121	0
A/Duck/Hunan/795/2002	A/Turkey/Turkey/1/2005	1.414	0
A/Duck/Hunan/795/2002	A/Egret/Egypt/1162-NAMRU3/2006	1	0
A/Duck/Hunan/795/2002	A/Chicken/Vietnam/Ncvd-016/2008	64	1
A/Duck/Hunan/795/2002	A/Bar-headedGoose/Qinghai/1A/2005	0.707	0
A/Duck/Hunan/795/2002	A/Egypt/1394-NAMRU3/2007	5.657	1
A/Duck/Hunan/795/2002	A/WhooperSwan/Mongolia/244/2005	1.414	0
A/Duck/Hunan/795/2002	A/Chicken/Korea/Gimje/2008	8	1
A/Duck/Hunan/795/2002	A/Egypt/2321-NAMRU3/2007	1.414	0
A/Duck/Hunan/795/2002	A/Turkey/65-596/2006	2.121	0
A/Duck/Hunan/795/2002	A/JapaneseWhiteEye/HongKong/1038/2006	22.627	1
A/Duck/Hunan/795/2002	A/Goose/Guiyang/337/2006	64	1
A/Duck/Hunan/795/2002	A/Egypt/4226-NAMRU3/2007	0.707	0

A/Duck/Hunan/795/2002	A/Egypt/0215-NAMRU3/2007	2	0
A/Duck/Hunan/795/2002	A/Chicken/India/Niv-33487/2006	1.414	0
A/Duck/Hunan/795/2002	A/Anhui/1/2005	32	1
A/Duck/Hunan/795/2002	A/Chicken/Egypt/9403-NAMRU3/2007	8	1
A/Duck/Hunan/795/2002	A/Egypt/2786-NAMRU3/2006	2	0
A/Bar-headedGoose/Qinghai/1A/2005	A/MuscovyDuck/Vietnam/1455/2006	1.914	0
A/Bar-headedGoose/Qinghai/1A/2005	A/Egret/Egypt/1162-NAMRU3/2006	0.707	0
A/Bar-headedGoose/Qinghai/1A/2005	A/Duck/Hunan/15/2004	8	1
A/Bar-headedGoose/Qinghai/1A/2005	A/Egypt/3300-NAMRU3/2008	24.6275	1
A/Bar-headedGoose/Qinghai/1A/2005	A/Guangxi/1/2005	8	1
A/Bar-headedGoose/Qinghai/1A/2005	A/Egypt/0215-NAMRU3/2007	2	0
A/Bar-headedGoose/Qinghai/1A/2005	A/Egypt/1394-NAMRU3/2007	2.828	0
A/Bar-headedGoose/Qinghai/1A/2005	A/Egypt/4226-NAMRU3/2007	1	0
A/Bar-headedGoose/Qinghai/1A/2005	A/Anhui/1/2005	13.657	1
A/Bar-headedGoose/Qinghai/1A/2005	A/Chicken/Egypt/9403-NAMRU3/2007	11.314	1
A/Bar-headedGoose/Qinghai/1A/2005	A/Egypt/2321-NAMRU3/2007	2	0
A/Bar-headedGoose/Qinghai/1A/2005	A/Egypt/2786-NAMRU3/2006	2	0
A/Bar-headedGoose/Mongolia/x53/2009	A/HongKong/6841/2010	1	0
A/Egypt/1394-NAMRU3/2007	A/Egypt/0215-NAMRU3/2007	5.657	1
A/Egypt/1394-NAMRU3/2007	A/Anhui/1/2005	32	1
A/Egypt/1394-NAMRU3/2007	A/Chicken/Egypt/9403-NAMRU3/2007	77.25	1
A/WhooperSwan/Mongolia/244/2005	A/Turkey/Turkey/1/2005	1.3105	0
A/WhooperSwan/Mongolia/244/20	A/Egret/Egypt/1162-	1	0

05	NAMRU3/2006		
A/WhooperSwan/Mongolia/244/2005	A/Chicken/Vietnam/Ncvd-016/2008	90.51	1
A/WhooperSwan/Mongolia/244/2005	A/Bar-headedGoose/Qinghai/1A/2005	1.5885	0
A/WhooperSwan/Mongolia/244/2005	A/Egypt/1394-NAMRU3/2007	2.828	0
A/WhooperSwan/Mongolia/244/2005	A/Chicken/Korea/Gimje/2008	16	1
A/WhooperSwan/Mongolia/244/2005	A/Egypt/2321-NAMRU3/2007	4	1
A/WhooperSwan/Mongolia/244/2005	A/Turkey/65-596/2006	1.5	0
A/WhooperSwan/Mongolia/244/2005	A/MuscovyDuck/Vietnam/1455/2006	2.828	0
A/WhooperSwan/Mongolia/244/2005	A/Goose/Guiyang/337/2006	90.51	1
A/WhooperSwan/Mongolia/244/2005	A/Egypt/3300-NAMRU3/2008	61.255	1
A/WhooperSwan/Mongolia/244/2005	A/Egypt/4226-NAMRU3/2007	1.414	0
A/WhooperSwan/Mongolia/244/2005	A/Egypt/0215-NAMRU3/2007	2.828	0
A/WhooperSwan/Mongolia/244/2005	A/Chicken/India/Niv-33487/2006	1	0
A/WhooperSwan/Mongolia/244/2005	A/Chicken/Egypt/9403-NAMRU3/2007	22.627	1
A/WhooperSwan/Mongolia/244/2005	A/Egypt/321/2007	2.828	0
A/WhooperSwan/Mongolia/244/2005	A/Egypt/2786-NAMRU3/2006	2.828	0
A/HongKong/156/1997	A/Teal/HongKong/2978.1/2002	5.657	1
A/HongKong/156/1997	A/Vietnam/1203/2004	16	1
A/HongKong/156/1997	A/Vietnam/Jp178/2004	5.657	1
A/HongKong/156/1997	A/Goose/HongKong/739.2/2002	2.828	0
A/HongKong/156/1997	A/HongKong/213/2003	6.657	1
A/HongKong/156/1997	A/Goose/Vietnam/113/2001	2.828	0
A/HongKong/156/1997	A/Vietnam/Jp4207/2005	5.657	1
A/HongKong/156/1997	A/Vietnam/Jp30321/2005	8	1

A/HongKong/156/1997	A/Vietnam/Jp14/2005	8	1
A/Chicken/Korea/Gimje/2008	A/Goose/Guiyang/337/2006	32	1
A/Chicken/Korea/Gimje/2008	A/Anhui/1/2005	65.1005	1
A/Chicken/Korea/Gimje/2008	A/Chicken/Vietnam/Ncvd-016/2008	45.255	1
A/Chicken/Korea/Gimje/2008	A/Duck/Laos/3295/2006	22.627	1
A/Chicken/Korea/Gimje/2008	A/JapaneseWhiteEye/HongKong/1038/2006	77.255	1
A/Egypt/2321-NAMRU3/2007	A/Egypt/0215-NAMRU3/2007	2	0
A/Egypt/2321-NAMRU3/2007	A/Egypt/1394-NAMRU3/2007	2.828	0
A/Egypt/2321-NAMRU3/2007	A/Egypt/4226-NAMRU3/2007	2.414	0
A/Egypt/2321-NAMRU3/2007	A/Anhui/1/2005	45.255	1
A/Egypt/2321-NAMRU3/2007	A/Egypt/N03072/2010	2.828	0
A/JapaneseWhiteEye/HongKong/1038/2006	A/Goose/Guiyang/337/2006	22.627	1
A/JapaneseWhiteEye/HongKong/1038/2006	A/Chicken/Vietnam/Ncvd-016/2008	32	1
A/Egypt/1394-NAMRU3/2007	A/Egypt/N03072/2010	1	0
A/MuscovyDuck/Vietnam/1455/2006	A/CommonMagpie/HongKong/5052/2007	2	0
A/MuscovyDuck/Vietnam/1455/2006	A/GreyHeron/HongKong/1046/2008	2	0
A/Thailand/16/2004	A/Duck/Hunan/15/2004	2	0
A/Thailand/16/2004	A/Guangxi/1/2005	11.314	1
A/Thailand/16/2004	A/Indonesia/Cdc625/2006	22.627	1
A/Goose/Guiyang/337/2006	A/Chicken/Vietnam/Ncvd-016/2008	22.627	1
A/Vietnam/Jp178/2004	A/Vietnam/Jp30321/2005	4	1
A/Vietnam/Jp178/2004	A/Vietnam/Jp4207/2005	1.414	0
A/Vietnam/Jp178/2004	A/Vietnam/Jp14/2005	1.414	0
A/Indonesia/Cdc625/2006	A/WhooperSwan/Mongolia/244/2005	4	1
A/Indonesia/Cdc625/2006	A/Anhui/1/2005	32	1
A/Indonesia/Cdc625/2006	A/Duck/Hunan/15/2004	16	1

A/Indonesia/Cdc625/2006	A/Guangxi/1/2005	32	1
A/Indonesia/Cdc625/2006	A/Bar-headedGoose/Qinghai/1A/2005	2.828	0
A/Egypt/0215-NAMRU3/2007	A/Egypt/3300-NAMRU3/2008	64	1
A/Egypt/0215-NAMRU3/2007	A/Chicken/Egypt/9403-NAMRU3/2007	32	1
A/Indonesia/5/2005	A/Turkey/Turkey/1/2005	5.657	1
A/Indonesia/5/2005	A/Duck/Hunan/795/2002	1.207	0
A/Indonesia/5/2005	A/Duck/Hunan/15/2004	8	1
A/Indonesia/5/2005	A/Bar-headedGoose/Qinghai/1A/2005	5.657	1
A/Indonesia/5/2005	A/Indonesia/Cdc357/2006	1.414	0
A/Indonesia/5/2005	A/WhooperSwan/Mongolia/244/2005	4.8285	1
A/Indonesia/5/2005	A/Chicken/Korea/Gimje/2008	43.3135	1
A/Indonesia/5/2005	A/Turkey/65-596/2006	4	1
A/Indonesia/5/2005	A/MuscovyDuck/Vietnam/1455/2006	2.828	0
A/Indonesia/5/2005	A/Goose/Guiyang/337/2006	64	1
A/Indonesia/5/2005	A/Guangxi/1/2005	11.314	1
A/Indonesia/5/2005	A/Indonesia/Cdc625/2006	5.657	1
A/Indonesia/5/2005	A/Chicken/India/Niv-33487/2006	4.8285	1
A/Indonesia/5/2005	A/CommonMagpie/HongKong/645/2006	8	1
A/Indonesia/5/2005	A/Duck/Laos/3295/2006	45.255	1
A/CommonMagpie/HongKong/645/2006	A/JapaneseWhiteEye/HongKong/1038/2006	2.828	0
A/Duck/Hunan/101/2004	A/Vietnam/1203/2004	4	1
A/Duck/Hunan/101/2004	A/Indonesia/5/2005	2.828	0
A/Duck/Hunan/101/2004	A/Bar-headedGoose/Qinghai/1A/2005	0.707	0
A/Chicken/Egypt/9403-NAMRU3/2007	A/Anhui/1/2005	22.627	1
A/Egypt/321/2007	A/Anhui/1/2005	90.51	1
A/Egypt/321/2007	A/Duck/Laos/3295/2006	16	1

A/Egypt/321/2007	A/JapaneseWhiteEye/HongKong/1038/2006	8	1
A/Vietnam/Jp14/2005	A/Vietnam/Jp30321/2005	2.828	0
A/Egypt/2786-NAMRU3/2006	A/Egypt/4226-NAMRU3/2007	2	0
A/Egypt/2786-NAMRU3/2006	A/Egypt/1394-NAMRU3/2007	2	0
A/Egypt/2786-NAMRU3/2006	A/Egypt/0215-NAMRU3/2007	2.828	0
A/Egypt/2786-NAMRU3/2006	A/Anhui/1/2005	90.51	1
A/Egypt/2786-NAMRU3/2006	A/Egypt/3300-NAMRU3/2008	181.019	1
A/Egypt/2786-NAMRU3/2006	A/Chicken/Egypt/9403-NAMRU3/2007	64	1
A/Egypt/2786-NAMRU3/2006	A/Egypt/2321-NAMRU3/2007	5.657	1
A/HongKong/6841/2010	A/Anhui/1/2005	32	1
A/Chicken/Vietnam/Ncvd-035/2008	A/Chicken/Vietnam/Ncvd-016/2008	45.255	1
A/Vietnam/1203/2004	A/Turkey/Turkey/1/2005	74	1
A/Vietnam/1203/2004	A/Chicken/Vietnam/Ncvd-035/2008	8	1
A/Vietnam/1203/2004	A/Indonesia/Cdc357/2006	16	1
A/Vietnam/1203/2004	A/Egypt/4226-NAMRU3/2007	32	1
A/Vietnam/1203/2004	A/Anhui/1/2005	88.5685	1
A/Vietnam/1203/2004	A/Duck/Laos/3295/2006	21.657	1
A/Vietnam/1203/2004	A/Chicken/Vietnam/Ncvd-016/2008	45.255	1
A/Vietnam/1203/2004	A/Bar-headedGoose/Qinghai/1A/2005	27.456	1
A/Vietnam/1203/2004	A/WhooperSwan/Mongolia/244/2005	48.9705	1
A/Vietnam/1203/2004	A/Egypt/2321-NAMRU3/2007	45.255	1
A/Vietnam/1203/2004	A/JapaneseWhiteEye/HongKong/1038/2006	86.6275	1
A/Vietnam/1203/2004	A/Egypt/0215-NAMRU3/2007	32	1
A/Vietnam/1203/2004	A/Vietnam/Jp30321/2005	16	1
A/Vietnam/1203/2004	A/Indonesia/5/2005	27.3135	1
A/Vietnam/1203/2004	A/Chicken/Egypt/9403-	90.51	1

	NAMRU3/2007		
A/Vietnam/1203/2004	A/Egypt/2786-NAMRU3/2006	90.51	1
A/Vietnam/1203/2004	A/Egypt/321/2007	45.255	1
A/Indonesia/Cdc357/2006	A/Anhui/1/2005	45.255	1
A/Vietnam/1194/2004	A/Turkey/Turkey/1/2005	11.314	1
A/Egypt/9539-NAMRU3/2009	A/Egypt/3300-NAMRU3/2008	32	1
A/Egypt/9539-NAMRU3/2009	A/Chicken/Egypt/9403-NAMRU3/2007	16	1
A/Vietnam/Jp4207/2005	A/Vietnam/Jp30321/2005	8	1
A/CommonMagpie/HongKong/5052/2007	A/Anhui/1/2005	32	1
A/CommonMagpie/HongKong/5052/2007	A/JapaneseWhiteEye/HongKong/1038/2006	16.9705	1
A/Egypt/3300-NAMRU3/2008	A/Anhui/1/2005	181.019	1
A/GreyHeron/HongKong/1046/2008	A/JapaneseWhiteEye/HongKong/1038/2006	16	1
A/Egypt/4226-NAMRU3/2007	A/Egypt/3300-NAMRU3/2008	48	1
A/Egypt/4226-NAMRU3/2007	A/Chicken/Egypt/9403-NAMRU3/2007	13.657	1
A/Anhui/1/2005	A/Chicken/Vietnam/Ncvd-016/2008	64	1
A/HongKong/213/2003	A/Vietnam/1203/2004	45.255	1
A/HongKong/213/2003	A/Vietnam/Jp178/2004	11.314	1
A/Duck/Hunan/795/2002	A/Egypt/3300-NAMRU3/2008	22.627	1
A/Bar-headedGoose/Qinghai/1A/2005	A/CommonMagpie/HongKong/5052/2007	7.657	1
A/Bar-headedGoose/Qinghai/1A/2005	A/GreyHeron/HongKong/1046/2008	5.657	1
A/Bar-headedGoose/Qinghai/1A/2005	A/JapaneseWhiteEye/HongKong/1038/2006	5	1
A/Bar-headedGoose/Mongolia/x53/2009	A/Anhui/1/2005	22.627	1

A/Egypt/1394-NAMRU3/2007	A/Egypt/3300-NAMRU3/2008	128	1
A/WhooperSwan/Mongolia/244/2005	A/Duck/Hunan/15/2004	16	1
A/WhooperSwan/Mongolia/244/2005	A/JapaneseWhiteEye/HongKong/1038/2006	22.627	1
A/WhooperSwan/Mongolia/244/2005	A/Guangxi/1/2005	22.627	1
A/WhooperSwan/Mongolia/244/2005	A/Anhui/1/2005	64	1
A/WhooperSwan/Mongolia/244/2005	A/Duck/Laos/3295/2006	22.627	1
A/Egypt/2321-NAMRU3/2007	A/Egypt/3300-NAMRU3/2008	144	1
A/Egypt/2321-NAMRU3/2007	A/Egypt/9539-NAMRU3/2009	8	1
A/Egypt/2321-NAMRU3/2007	A/Chicken/Egypt/9403-NAMRU3/2007	33.941	1
A/MuscovyDuck/Vietnam/1455/2006	A/JapaneseWhiteEye/HongKong/1038/2006	3.8285	0
A/Thailand/16/2004	A/Bar-headedGoose/Qinghai/1A/2005	11.314	1
A/Thailand/16/2004	A/Indonesia/Cdc357/2006	22.627	1
A/Thailand/16/2004	A/WhooperSwan/Mongolia/244/2005	27.3135	1
A/Thailand/16/2004	A/Anhui/1/2005	33.941	1
A/Thailand/16/2004	A/Indonesia/5/2005	22.627	1
A/Thailand/16/2004	A/Egypt/321/2007	32	1
A/Thailand/16/2004	A/Duck/Laos/3295/2006	11.314	1
A/Thailand/16/2004	A/JapaneseWhiteEye/HongKong/1038/2006	32	1
A/Egypt/0215-NAMRU3/2007	A/Anhui/1/2005	32	1
A/Indonesia/5/2005	A/Chicken/Vietnam/Ncvd-016/2008	27.3135	1
A/Indonesia/5/2005	A/JapaneseWhiteEye/HongKong/1038/2006	22.627	1
A/Indonesia/5/2005	A/Anhui/1/2005	16	1
A/Chicken/Egypt/9403-	A/Egypt/3300-NAMRU3/2008	19.31	1

NAMRU3/2007		35	

Part II Viral strains used in the HI dataset above.

The HA protein sequences were downloaded from Influenza Virus Resourcs for most virus except two virus A/Egypt/321/2007 and A/Chicken/Vietnam/Ncvd-035/2008 (in bold), those of which were downloaded from GISAID.

Strain	Clade it belongs to	Accession number
A/HongKong/156/1997	0	GU052127
A/Goose/Vietnam/113/2001	3	GU052105
A/Duck/Hunan/795/2002	2.1.1	CY028963
A/Goose/HongKong/739.2/2002	1	GU052457
A/Teal/HongKong/2978.1/2002	5	AY651352
A/HongKong/213/2003	1	EF541401
A/Duck/Hunan/15/2004	2.3.3	EF670479
A/Duck/Hunan/101/2004	2.3.1	AY651365
A/Thailand/16/2004	1	EU268219
A/Vietnam/1203/2004	1	EF541403
A/Vietnam/Jp178/2004	1	EF456795
A/Vietnam/1194/2004	1	AY651333
A/Anhui/1/2005	2.3.4	DQ371928
A/Bar-headedGoose/Qinghai/1A/2005	2.2	DQ659327
A/Guangxi/1/2005	2.3.4	DQ371930
A/Indonesia/5/2005	2.1.3.2	EF541394
A/Turkey/Turkey/1/2005	2.2.1	EF619980
A/Vietnam/Jp4207/2005	1	EF456798
A/Vietnam/Jp30321/2005	1	EF456802
A/Vietnam/Jp14/2005	1	EF456799
A/WhooperSwan/Mongolia/244/2005	2.2	DQ659326
A/Egypt/2786-NAMRU3/2006	2.2.1	EF042616
A/Chicken/India/Niv-33487/2006	2.2	EF362418
A/CommonMagpie/HongKong/645/2006	2.3.4	DQ992839
A/Duck/Laos/3295/2006	2.3.4	DQ845348
A/Egret/Egypt/1162-NAMRU3/2006	2.2.1	EU719116
A/Goose/Guiyang/337/2006	4	DQ992765
A/Indonesia/Cdc625/2006	2.1.2	CY014433
A/Indonesia/Cdc357/2006	2.1.3.2	CY014207
A/JapaneseWhiteEye/HongKong/1038/2006	2.3.4	DQ992842

A/MuscovyDuck/Vietnam/1455/2006	2.3.2	CY029535
A/Turkey/65-596/2006	2.2	EF619998
A/Egypt/0215-NAMRU3/2007	2.2.1	FJ226064
A/Chicken/Egypt/9403-NAMRU3/2007	2.2.1.1	EU623468
A/CommonMagpie/HongKong/5052/2007	2.3.2.1	CY036173
A/Egypt/2321-NAMRU3/2007	2.2.1	EF535822
A/Egypt/321/2007	2.2.1	**EPI173707**
A/Egypt/4226-NAMRU3/2007	2.2.1	EU095032
A/Egypt/1394-NAMRU3/2007	2.2.1	EF535817
A/Chicken/Vietnam/Ncvd-035/2008	2.3.4.2	**EPI284489**
A/Chicken/Vietnam/Ncvd-016/2008	7.1	FJ842476
A/Chicken/Korea/Gimje/2008	2.3.2.1	GQ412053
A/Egypt/3300-NAMRU3/2008	2.2.1.1	FJ226061
A/GreyHeron/HongKong/1046/2008	2.3.2.1	CY036245
A/Bar-headedGoose/Mongolia/x53/2009	2.3.2.1	AB523767
A/Egypt/9539-NAMRU3/2009	2.2.1	CY062457
A/Egypt/N03072/2010	2.2.1	CY062484
A/HongKong/6841/2010	2.3.2.1	HQ636461

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