

Electronic Supplementary Material

Molecular Epidemiology and Vaccine Compatibility Analysis of Seasonal Influenza Viruses in Wuhan, 2016–2019

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Supplementary Materials

Table S1. Amino acid substitutions in the 8 segments of A(H3N2) isolated in Wuhan city, Hubei province, China during 2016-2019.

Subtype	Season	Strains	HA	NA
H3N2	Vaccine strain 2017	A/Hong Kong/4801/2014	-	-
		A/Wuhan/279/2017	S112N, T147K, R158K, K176T, X219T, R277Q	I231V, S245N, S247T, T267K, G346S, I380V, T392I, P468H
		A/Wuhan/458/2017	S112N, T147K, R158K, K176T, X219T	I231V, S245N, S247T, T267K, G346S, I380V, T392I, P468H
		A/Wuhan/1001/2017	S112N, T147K, R158K, K176T, X219T	T56K, I231V, S245N, S247T, T267K, V313A, I380V, T392I, D463N, P468H
	Vaccine strain 2018	A/Singapore/INFIMH-16-0019/2016	S112N, N137K, R158G, K176T, N187K, X219T, I422V, G495E	V212I, I231V, S245N, S247T, T267K, D339N, I380V, T392I, P468H
		A/Wuhan/556/2018	S112N, T147K, R158K, K176T, X219T, A546T	I231V, S245N, S247T, T267K, I380V, T392I, D463N, P468H
		A/Wuhan/1978/2018	S112N, T147K, R158K, K176T, X219T	I231V, S245N, S247T, T267K, I380V, T392I, D463N, P468H
		A/Wuhan/2153/2018	K108R, S112N, N137K, T151N, K176T, N187K, X219T, H327Q, I422V, G495E	E41G, P45L, K220N, I231V, S245N, S247T, T267K, V303I, N329S, D339N, I380V, T392I, P468H
	Vaccine strain 2019	A/Wuhan/2785/2018	K108R, S112N, S126X, N137K, T151K, R158G, K176T, N187K, X219T, H327Q, I422V, G495E	E41G, P45L, K220N, I231V, S245N, S247T, T267K, V303I, N329S, D339N, I380V, T392I, P468H
		A/Kansas/14/2017	Y9C, S107N, S112N, T144A, A154S, R158G, S160K, Y175S, K176T, F209S, X219T, H327Q, K342R, I494M	K75R, L140I, V149A, Y155H, I231V, S245N, S247T, T267K, N329T, D339N, E344K, I380V, T392I, P468H
		A/Wuhan/345/2019	I41T, E78G, K108R, S112N, N137K, T147K, R158G, K176T, N187K, X219T, H327Q, V363M, M478I, G495E, V545I	P126L, K220N, I231V, S245N, S247T, T267K, V303I, S315R, N329S, D339N, E344K, G346D, I380V, T392I, P468H
		A/Wuhan/877/2019	K18E, E78G, K108R, S112N, N137K, R158G, K176T, N187K, F209S, X219T, H327Q, I422V, G495E, V545I	K80R, P126L, K220N, I231V, S245N, S247T, T267K, V303I, S315R, N329S, D339N, E344K, G346D, I380V, T392I, P468H
		A/Wuhan/1120/2019	E78G, K108R, S112N, N137K, R158G, K176T, N187K, X219T, H327Q, V363M, I422V, G495E, V545I	P126L, K220N, I231V, S245N, S247T, T267K, Y284F, V303I, S315R, N329S, D339N, E344K, G346D, I380V, T392I, D463N, P468H
A/Wuhan/5413/2019	K18E, E78G, K108R, S112N, N137K, R158G, K176T, N187K, F209S, X219T, H327Q, I422V, G495E, V545I	P126L, K220N, I231V, S245N, S247T, T267K, V303I, S315R, N329S, D339N, E344K, G346D, I380V, T392I, P468H		
A/Wuhan/11193/2019	E78G, K108R, S112N, N137K, R158G, K176T, N187K, X219T, H327Q, V363M, I422V, G495E, V545I	P126L, K220N, I231V, S245N, S247T, V263I, T267K, V303I, S315R, N329S, D339N, E344K, G346D, I380V, T392I, D463N, P468H		

Table S1 (continue)

Subtype	Season	Strains	M1	M2	NP	NS1	NS2	PA
H3N2	Vaccine strain 2017	A/Hong Kong/4801/2014	-	-	-	-	-	-
		A/Wuhan/279/2017	-	-	X	N74D, G139D, V182I	-	N272S, I668V
		A/Wuhan/458/2017	-	-	X	A56S, E71G, N74D, V182I	-	C225S, N272S, I668V
		A/Wuhan/1001/2017	-	X	X	N74D, S87X, V182I	-	N272S, I668V
	Vaccine strain 2018	A/Singapore/INFIMH-16-0019/2016	-	V27A, K78X	X	A56S, E71G, N74D, V182I, G183X	-	F105L, N272S, I668V, G684X
		A/Wuhan/556/2018	-	-	X	N74D, V182I	-	C225S, N272S, I668V
		A/Wuhan/1978/2018	-	-	X	G51S, K67N, N74D, V182I	-	N272S, I668V
		A/Wuhan/2153/2018	-	-	X	A56S, E71G, N74D, V182I	-	N272S
	Vaccine strain 2019	A/Wuhan/2785/2018	-	-	X	A56S, E71G, N74D, V182I	-	N272S
		A/Kansas/14/2017	-	V27I, Y52C	X	V60A, V65I, N74D, N127K, V182I	-	N272S
		A/Wuhan/345/2019	-	P25L	X	A56S, E71G, N74D, V182I, N207H	-	K158R, Q256R, N272S
		A/Wuhan/877/2019	-	-	X	A56S, E71G, N74D, V182I, N207H, N209D	E26G	E2G, K158R, Q256R, N272S, M441T, M595I
		A/Wuhan/1120/2019	-	P25L	X	A56S, E71G, N74D, V182I, N207H	-	K158R, N272S, K328R
		A/Wuhan/5413/2019	-	-	X	A56S, E71G, N74D, V182I, N207H, N209D, P212S	-	E2G, K158R, Q256R, N272S, M441T, M595I
A/Wuhan/11193/2019	-	P25L, V68I	X	A56S, E71G, N74D, V182I, N207H, T225A	E26G	K158R, N272S, V432I		

Table S1 (continue)

Subtype	Season	Strains	PB1	PB2
H3N2	Vaccine strain 2017	A/Hong Kong/4801/2014	-	-
		A/Wuhan/279/2017	T152S, Y166F, I181V	V63I, G222X, R299K, S489F, I588T
		A/Wuhan/458/2017	T152S, Y166F, I181V	V63I, R299K, I588T
	Vaccine strain 2018	A/Wuhan/1001/2017	T152S, Y166F, I181V, A374X, S375N	V63I, G222X, R299K, I588T
		A/Singapore/INFIMH-16-0019/2016	T152S, Y166F	V63I, V96I, R299K, I588T
		A/Wuhan/556/2018	T152S, Y166F, I181V, S375N	V63I, R299K, I588T
		A/Wuhan/1978/2018	T152S, Y166F, I181V, S375N	V63I, R299K, I588T
	Vaccine strain 2019	A/Wuhan/2153/2018	T152S, Y166F, I181V	L10X, V63I, K140X, K340R, I588T
		A/Wuhan/2785/2018	T152S, Y166F, I181V	L10X, V63I, K140X, K340R, I588T
		A/Kansas/14/2017	T152S, Y166F	V63I, R299K, I588T, Y658X
		A/Wuhan/345/2019	T152S, Y166F, E618D	V63I, A84X, S107N, K340R, M410V, D506X, V584I, I588T
		A/Wuhan/877/2019	T152S, Y166F, E618D	V63I, S107N, K340R, M410V, I588T
		A/Wuhan/1120/2019	T152S, Y166F, E618D	V63I, S107N, K340R, M410V, I588T, N759K
		A/Wuhan/5413/2019	T152S, Y166F, E618D	V63I, S107N, K340R, M410V, I588T
A/Wuhan/11193/2019	T152S, Y166F, E618D	V63I, S107N, K340R, M410V, I588T		

Table S2. Amino acid substitutions in the 8 segments of A(H1N1)pdm09 isolated in Wuhan city, Hubei province, China during 2016-2019.

Subtype	Season	Strains	HA	NA
H1N1	Vaccine strain 2018	A/Michigan/45/2015	-	-
		A/Wuhan/121/2018	N55D, S91R, S181T, V190I, I312V	V81A, I188T, N449D
		A/Wuhan/225/2018	S91R, S181T, I312V	V81A, I188T, N449D
		A/Wuhan/378/2018	S91R, S181T, S200P, I312V	A75D, V81A, I188T, P272X, R419K, N449D
		A/Wuhan/399/2018	S91R, S181T, V190I, I312V, I564K	P3L, V81A, I188T, R419K, N449D
		A/Wuhan/763/2018	N55D, S91R, S181T, V190I, I312V, G558E, R563K	V81A, I188T, R419K, N449D
	Vaccine strain 2019	A/Wuhan/854/2018	S91R, S181T, S200P, T273I, I312V	V81A, C161S, I188T, N449D
		A/Brisbane/02/2018	R62G, S91R, S181T, S200P, Q240R, P299A, I312V, I315V	I13T, V81A, I188T, N449D
		A/Wuhan/505/2019	S91R, N146D, K177N, S181T, S200P, T202I, N277D, I312V, R526K	Q51K, F74S, V81A, S82P, I188T, D416N, N449D, T452I
		A/Wuhan/795/2019	S91R, T137A, S181T, I312I, D502E	M19L, T72N, V81A, I188T, I365T, I389M, D416N, N449D
		A/Wuhan/899/2019	Y3V, Y10C, S91R, H143Y, S181T, S200P, L250I, I312V, V537A	F74L, V81A, I188T, I436V, N449D
		A/Wuhan/1054/2019	Y3V, S91R, D111N, L178I, S181T, I312V, I421M, N472T	F74L, G77K, V81A, I188T, A232V, V267A, S400T, N449D
		A/Wuhan/2231/2019	Y3A, S91R, S181T, I312V, K319T, I421M, N513S, E523D	T48A, V81A, M314I, N449D

Table S2 (continue)

Subtype	Season	Strains	M1	M2	NP	NS1	NS2	PA
H1N1	Vaccine strain 2018	A/Michigan/45/2015	-	-	-	-	-	-
		A/Wuhan/121/2018	K252R	S23G, I39V	S152A, E500Q	M65V	-	I145X, A448X
		A/Wuhan/225/2018	K252R	S23G, I39V	R14X, S152A	M65V	-	D394N
		A/Wuhan/378/2018	-	I33X, I39X	S152A, A196T	M65V	-	-
		A/Wuhan/399/2018	K252R	S23G, I39V	S152A	M65V	-	D394N
		A/Wuhan/763/2018	-	I33V	S152A	M65V	-	D394N
	Vaccine strain 2019	A/Wuhan/854/2018	K252R	S23G, I39V	S152A, N479T	M65V	-	-
		A/Brisbane/02/2018	-	P10H	G108R, S152A	M65V	-	I61T
		A/Wuhan/505/2019	-	R61G	S152A, T221A, V431I	M65V, T80A	-	A17X
		A/Wuhan/795/2019	-	R61G	S152A	M65V, E131K, A155T	-	P534L
		A/Wuhan/899/2019	-	-	I4S, S152A, V319I, E500G	M65V	-	C8S, D419N
		A/Wuhan/1054/2019	-	-	S152A	M65V	-	A343T
		A/Wuhan/2231/2019	-	E14G	S152A	M65V, I111M,	A89T	I13V, P400L

Table S2 (continue)

Subtype	Season	Strains	PB1	PB2
H1N1	Vaccine strain 2018	A/Michigan/45/2015	-	-
		A/Wuhan/121/2018	S261N, N284D, N314D, X384S	R299K, T398I, P453T
		A/Wuhan/225/2018	S261N, K308R, T435I, K486R, D619G	R299K, T398I, D441E, P453T
		A/Wuhan/378/2018	N284D, T435I, K486R, D619G	I289F, R299K, T398I, P453T
		A/Wuhan/399/2018	Q65H, E232Q, S261N, N312H, N328D	R299K, T398I, P453T
		A/Wuhan/763/2018	S261N	R299K, T398I, P453T, V518I
		A/Wuhan/854/2018	T204A	R299K, T398I, P453T
	Vaccine strain 2019	A/Brisbane/02/2018	N213D	D65N, R299K, T398I, P453T
		A/Wuhan/505/2019	K386R	T81I, G225S, R299K, T398I, P453T, V667I
		A/Wuhan/795/2019	T677S, S720C	R144K, A156V, R299K, R368K, T398I, P453T
		A/Wuhan/899/2019	N455T, V728I	I66T, R299K, T398I, P453T, S470N
		A/Wuhan/1054/2019	P454T, K480R	V227I, R299K, T398I, S405T, P453T
		A/Wuhan/2231/2019	-	R299K, T398I, P453T

Table S3. Amino acid substitutions in the HA and NA of FLUBV isolated in Wuhan city, Hubei province, China during 2016-2019.

Subtype	Season	Strains	HA	NA
FLUBV	Vaccine strain 2018	B/Phuket/3073/2013	-	-
		B/Wuhan/139/2018	L187Q, M266V, V561X	I171M, D342K, K373Q
	2019	B/Wuhan/413/2018	L187Q, M266V	I171M, D342K, K373Q
		B/Wuhan/534/2018	L187Q, M266V, N436D	I171M, D342K, K373Q
		B/Wuhan/1055/2019	L187Q, M266V, N436D	R65H, I171M, S246T, D342K, K373Q
		B/Wuhan/2015/2019	L187Q, M266V, G292X, N436D, R512X	R65H, I171M, S246T, D342K, K373Q

Table S4. List of the FLUV used for phylogenetic analyses in this study.

Strain	GISAID Epiflu ID or GenBank accession number	Note
A(H3N2)		
A/Hong Kong/2060/2018	EPI_ISL_342207	GISAID
A/Shanghai/36/2017	EPI_ISL_302556	GISAID
A/Wuhan/2153/2018	MN594841	GenBank
A/Taiwan/1436/2017	EPI_ISL_304334	GISAID
A/Zhejiang-Nanhu/1745/2017	EPI_ISL_303154	GISAID
A/China/LZP/2017	EPI_ISL_379843	GISAID
A/Guangdong/SKLRD01/2017	EPI_ISL_328489	GISAID
A/Hong Kong/119/2019	EPI_ISL_253104	GISAID
A/Hong Kong/38/2019	EPI_ISL_347931	GISAID
A/Hong Kong/116/2019	EPI_ISL_348148	GISAID
A/Hong Kong/120/2019	EPI_ISL_349925	GISAID
A/Wuhan/11193/2019	MN594847	GenBank
A/Wuhan/1120/2019	MN594845	GenBank
A/Wuhan/345/2019	MN594843	GenBank
A/Chongqing-Yuzhong/11841/2018	EPI_ISL_334510	GISAID
A/Taiwan/81209/2018	EPI_ISL_348155	GISAID
A/Norway/3275/2018	EPI_ISL_386912	GISAID
A/Wuhan/5413/2019	MN594846	GenBank
A/Wuhan/877/2019	MN594844	GenBank
A/Taiwan/383/2017	EPI_ISL_274672	GISAID
A/Shanghai/31/2017	EPI_ISL_302551	GISAID
A/Hong Kong/45/2019	EPI_ISL_349926	GISAID
A/Hong Kong/121/2019	EPI_ISL_344657	GISAID
A/Beijing-Huairou/1557/2018	EPI_ISL_330017	GISAID
A/Hong Kong/681/2018	EPI_ISL_344857	GISAID
A/Guangxi-Babu/1913/2018	EPI_ISL_334504	GISAID
A/Wuhan/2785/2018	MN594842	GenBank
A/Greece/4/2017	EPI_ISL_277878	GISAID
A/Taiwan/364/2017	EPI_ISL_274680	GISAID
A/Hong Kong/3569/2017	EPI_ISL_275840	GISAID
A/Singapore/INFIMH-16-0019/2016	EPI_ISL_330262	GISAID
A/Wuhan/556/2018	MN594839	GenBank
A/Wuhan/1978/2018	MN594840	GenBank
A/Wuhan/1001/2017	MN594838	GenBank
A/Liaoning-Yinzhou/1399/2017	EPI_ISL_290628	GISAID
A/Zhejiang-Shangcheng/1812/2017	EPI_ISL_309764	GISAID
A/Guizhou-Nanming/1958/2018	EPI_ISL_330015	GISAID
A/Hong Kong/3554/2017	EPI_ISL_277511	GISAID
A/Hong Kong/4946/2017	EPI_ISL_294226	GISAID
A/Bretagne/1413/2017	EPI_ISL_283128	GISAID
A/Switzerland/8060/2017	EPI_ISL_332305	GISAID
A/Beijing-Chaoyang/12841/2018	EPI_ISL_334516	GISAID
A/Shanghai/9/2017	EPI_ISL_302580	GISAID
A/Wuhan/458/2017	MN594837	GenBank
A/Wuhan/279/2017	MN594836	GenBank
A/Fujian-Licheng/1729/2017	EPI_ISL_303156	GISAID
A/Zhejiang-Xihu/35/2017	EPI_ISL_309765	GISAID
A/Zhejiang-Jiaojiang/113/2018	EPI_ISL_367046	GISAID
A/Zhejiang-Shangcheng/1153/2018	EPI_ISL_377068	GISAID
A/Shanghai/41/2017	EPI_ISL_302563	GISAID
A/Hong Kong/3548/2017	EPI_ISL_275822	GISAID
A/Cote D' Ivoire/544/2016	EPI_ISL_226075	GISAID
A/Taiwan/423/2017	EPI_ISL_276930	GISAID

Table S4. (Continue)

Strain	GISAID Epiflu ID or GenBank accession number	Note
A(H3N2)		
A/Valladolid/182/2017	EPI_ISL_294255	GISAID
A/Taiwan/441/2017	EPI_ISL_276933	GISAID
A/Hong Kong/4801/2014	EPI_ISL_270160	GISAID
A/Hong Kong/5738/2014	EPI_ISL_168694	GISAID
A/Zhejiang-Yongkang/1978/2017	EPI_ISL_309766	GISAID
A/England/538/2018	EPI_ISL_312041	GISAID
A/Beijing/2019-15554/2018	EPI_ISL_344170	GISAID
A/Kansas/14/2017	MK025787	GenBank
A/Texas/50/2012	KC892952	GenBank
A(H1N1)pdm09		
A/Beijing-Xicheng/1633/2018	EPI_ISL_322367	GISAID
A/Zhejiang-Xiacheng/SWL132/2018	EPI_ISL_335041	GISAID
A/Hong Kong/1126/2018	EPI_ISL_319753	GISAID
A/Hong Kong/4978/2017	EPI_ISL_303176	GISAID
A/Wuhan/854/2018	MN594931	GenBank
A/Wuhan/378/2018	MN594928	GenBank
A/Brisbane/02/2018	EPI_ISL_344858	GISAID
A/Wuhan/899/2019	MN594934	GenBank
A/Sichuan-Qingyang/11819/2018	EPI_ISL_342296	GISAID
A/Taiwan/81169/2018	EPI_ISL_344763	GISAID
A/Hong Kong/109/2019	EPI_ISL_348037	GISAID
A/Taiwan/80730/2018	EPI_ISL_331197	GISAID
A/Switzerland/2656/2017	EPI_ISL_316751	GISAID
A/Hainan-Xiuying/11613/2018	EPI_ISL_349807	GISAID
A/Fujian-Gulou/1884/2018	EPI_ISL_353415	GISAID
A/Hong Kong/2272/2018	EPI_ISL_362543	GISAID
A/Hong Kong/99/2019	EPI_ISL_344759	GISAID
A/Wuhan/795/2019	MN594933	GenBank
A/Guangdong/GLW/2018	EPI_ISL_335963	GISAID
A/Ireland/84630/2018	EPI_ISL_338060	GISAID
A/Switzerland/3330/2017	EPI_ISL_321313	GISAID
A/Norway/3433/2018	EPI_ISL_332840	GISAID
A/Hong Kong/105/2019	EPI_ISL_344758	GISAID
A/Taiwan/79809/2018	EPI_ISL_344764	GISAID
A/Wuhan/505/2019	MN594932	GenBank
A/Wuhan/1054/2019	MN594935	GenBank
A/Hong Kong/124/2019	EPI_ISL_348036	GISAID
A/Xinjiang-Atushi/1631/2018	EPI_ISL_344424	GISAID
A/Hong Kong/4975/2017	EPI_ISL_303177	GISAID
A/Wuhan/2231/2019	MN594936	GenBank
A/Hong Kong/3647/2017	EPI_ISL_275658	GISAID
A/Hong Kong/4974/2017	EPI_ISL_303163	GISAID
A/Taiwan/1437/2017	EPI_ISL_302869	GISAID
A/Zhejiang-Shangcheng/SWL132/2018	EPI_ISL_309774	GISAID
A/Hunan-Wuling/1468/2018	EPI_ISL_322326	GISAID
A/Hong Kong/4988/2017	EPI_ISL_300843	GISAID
A/Paris/1447/2017	EPI_ISL_284660	GISAID
A/Wuhan/121/2018	MN594926	GenBank
A/Zhejiang-Kecheng/SWL113/2018	EPI_ISL_297042	GISAID
A/Wuhan/399/2018	MN594929	GenBank
A/Wuhan/763/2018	MN594930	GenBank
A/Wuhan/225/2018	MN594927	GenBank
A/Zhejiang-CHEN/2018	EPI_ISL_309777	GISAID

Table S4. (Continue)

Strain	GISAID Epiflu ID or GenBank accession number	Note
A(H1N1)pdm09		
A/Taiwan/255/2019	EPI_ISL_277396	GISAID
A/Beijing-Dongcheng/SWL331/2017	EPI_ISL_314046	GISAID
A/Hong Kong/4792/2017	EPI_ISL_286077	GISAID
A/Zhejiang-LI/2018	EPI_ISL_309779	GISAID
A/Hong Kong/3649/2017	EPI_ISL_281598	GISAID
A/Slovenia/2903/2015	EPI_ISL_223353	GISAID
A/Guizhou-Qingzhen/1331/2017	EPI_ISL_270692	GISAID
A/Michigan/45/2015	EPI_ISL_336680	GISAID
A/South Africa/3626/2013	EPI_ISL_145448	GISAID
A/Israel/Q-504/2015	EPI_ISL_207902	GISAID
A/Zhejiang-Wuxing/SWL122/2018	EPI_ISL_309770	GISAID
A/Shanghai-Huangpu/SWL12017/2015	EPI_ISL_334460	GISAID
A/Zhejiang-Yiwu/SWL128/2018	EPI_ISL_309776	GISAID
A/Cote d'Ivoire/0012/2014	EPI_ISL_156882	GISAID
A/Dakar/06/2014	EPI_ISL_166052	GISAID
A/Hong Kong/5659/2012	EPI_ISL_127652	GISAID
A/Astrakhan/1/2011	EPI_ISL_90787	GISAID
A/Lviv/N6/2009	EPI_ISL_62012	GISAID
A/Bayern/69/2009	EPI_ISL_73686	GISAID
A/California/07/2009	EPI_ISL_203615	GISAID
FLUBV		
B/Hong Kong/61/2019	EPI_ISL_377194	GISAID
B/Gansu-Ganzhou/1140/2019	EPI_ISL_367095	GISAID
B/Anhui-Dangtu/1158/2019	EPI_ISL_367164	GISAID
B/Hubei-Qianjiang/2161/2017	EPI_ISL_334760	GISAID
B/Guizhou-Xinyi/1216/2018	EPI_ISL_334812	GISAID
B/Guizhou-Bijiang/1254/2019	EPI_ISL_367094	GISAID
B/Xinjiang-Hami/1608/2017	EPI_ISL_334689	GISAID
B/Fujian-Chengxiang/1263/2018	EPI_ISL_334733	GISAID
B/Zhejiang-Yuecheng/158/2018	EPI_ISL_309755	GISAID
B/Liaoning-Xinlongtai/1106/2018	EPI_ISL_334804	GISAID
B/Liaoning-Baita/1175/2018	EPI_ISL_334701	GISAID
B/Hong Kong/1287/2018	EPI_ISL_314102	GISAID
B/Wuhan/413/2018	MN594825	GenBank
B/Jilin-Chuanying/1510/2018	EPI_ISL_334730	GISAID
B/Anhui-Xuanzhou/1313/2018	EPI_ISL_335090	GISAID
B/Yunnan-Dali/1918/2018	EPI_ISL_334485	GISAID
B/Shanxi-Lishi/1642/2017	EPI_ISL_334784	GISAID
B/Heilongjiang-Beilin/1187/2018	EPI_ISL_334708	GISAID
B/Wuhan/139/2018	MN594824	GenBank
B/Guangxi-Xiangshan/11016/2019	EPI_ISL_377017	GISAID
B/Yunnan-Linxiang/1550/2019	EPI_ISL_377016	GISAID
B/Anhui-Huashan/11117/2019	EPI_ISL_367337	GISAID
B/Norway/1954/2019	EPI_ISL_357453	GISAID
B/Liaoning-Shuncheng/1296/2018	EPI_ISL_335002	GISAID
B/Hainan-Xiuying/1980/2017	EPI_ISL_334837	GISAID
B/Guangxi-Jinchengjiang/12653/2019	EPI_ISL_367336	GISAID
B/Beijing-Huairou/12094/2017	EPI_ISL_290564	GISAID
B/Henan-Chuanhui/1584/2017	EPI_ISL_334827	GISAID
B/Hubei-Dongbao/1934/2017	EPI_ISL_334866	GISAID
B/Ningxia-Shapotou/1553/2017	EPI_ISL_290556	GISAID
B/Heilongjiang-Jiagedaqi/1294/2018	EPI_ISL_335099	GISAID
B/Hong Kong/732/2017	EPI_ISL_288640	GISAID

Table S4. (Continue)

Strain	GISAID Epiflu ID or GenBank accession number	Note
FLUBV		
B/Wuhan/534/2018	MN594826	GenBank
B/Wuhan/1055/2019	MN594827	GenBank
B/Wuhan/2015/2019	MN594828	GenBank
B/Hainan-Xiuying/1824/2017	EPI_ISL_334853	GISAID
B/Jiangxi-Anyuan/1679/2017	EPI_ISL_285906	GISAID
B/Guangxi-Gangbei/1861/2017	EPI_ISL_288700	GISAID
B/Henan-Weibin/1647/2017	EPI_ISL_290559	GISAID
B/Yunnan-Wenshan/1867/2017	EPI_ISL_288704	GISAID
B/Taiwan/60/2017	EPI_ISL_276801	GISAID
B/Beijing-Huairou/1444/2017	EPI_ISL_270704	GISAID
B/Zhejiang-Jiaojiang/1876/2017	EPI_ISL_334828	GISAID
B/Sichuan-Dongpo/1270/2017	EPI_ISL_270674	GISAID
B/Anhui-Yingjiang/11179/2017	EPI_ISL_334838	GISAID
B/Hunan-Heshan/126/2017	EPI_ISL_253318	GISAID
B/Anhui-Dangtu/1593/2019	EPI_ISL_367067	GISAID
B/Guizhou-Qingzhen/1161/2018	EPI_ISL_334704	GISAID
B/Hunan-Tianyuan/11081/2018	EPI_ISL_296995	GISAID
B/Xinjiang-Bole/1451/2017	EPI_ISL_334854	GISAID
B/Hebei-Ningjin/17/2018	EPI_ISL_297008	GISAID
B/Chongqing-Yuzhong/3179/2017	EPI_ISL_290575	GISAID
B/Jiangsu-Haizhou/365/2017	EPI_ISL_288684	GISAID
B/Beijing-Huairou/11345/2017	EPI_ISL_278524	GISAID
B/Jiangxi-Yuanzhou/1580/2017	EPI_ISL_270673	GISAID
B/Guangxi-Xiangshan/1871/2017	EPI_ISL_334857	GISAID
B/Phuket/3073/2013	EPI_ISL_336681	GISAID
B/Wisconsin/01/2010	EPI_ISL_112325	GISAID
B/Stockholm/12/2011	EPI_ISL_246496	GISAID
B/Estonia/55669/2011	EPI_ISL_246900	GISAID