

## Electronic Supplementary Material

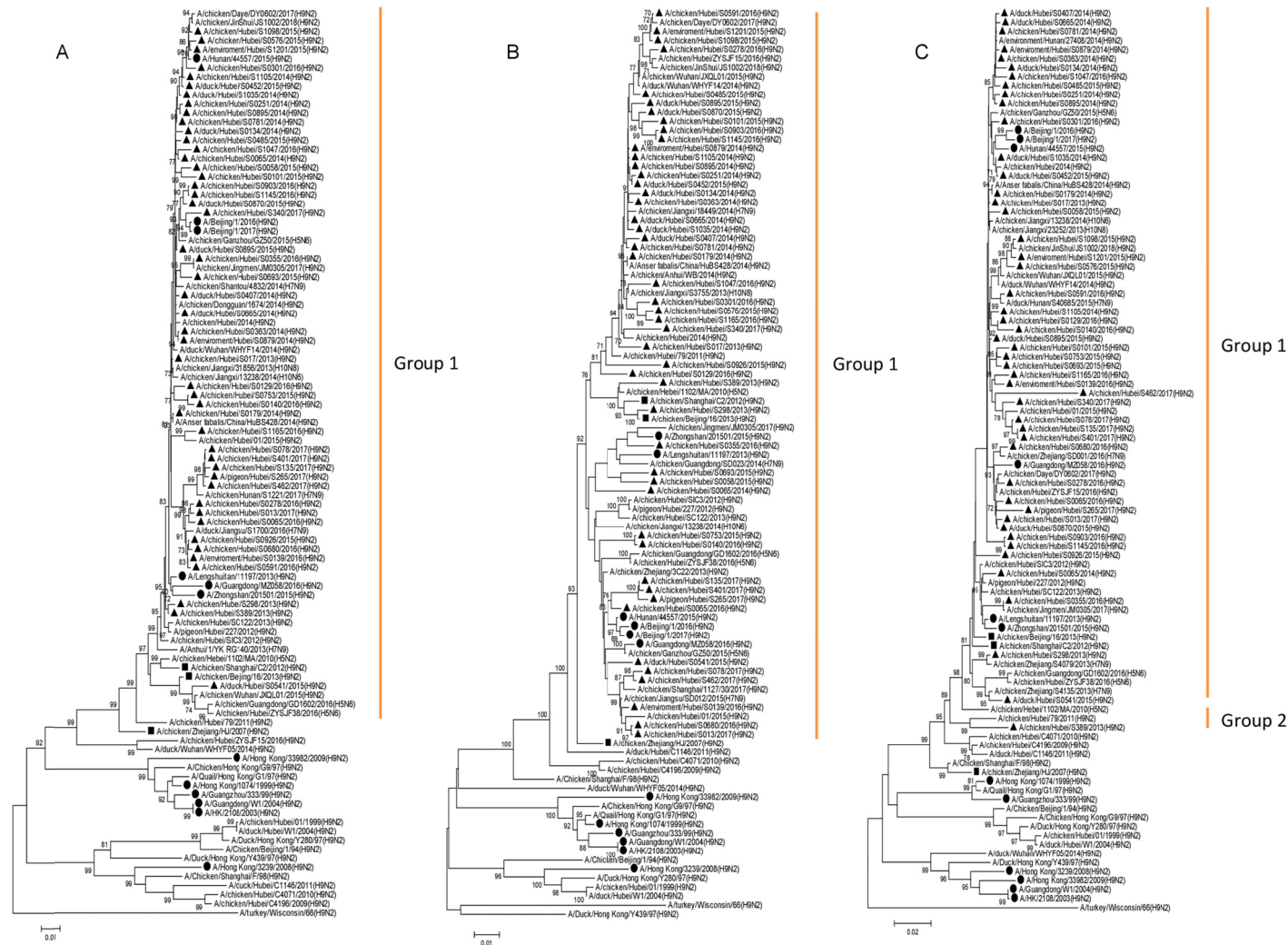
### Genetic and Molecular Characterization of H9N2 Avian Influenza Viruses Isolated from Live Poultry Markets in Hubei Province, Central China, 2013–2017

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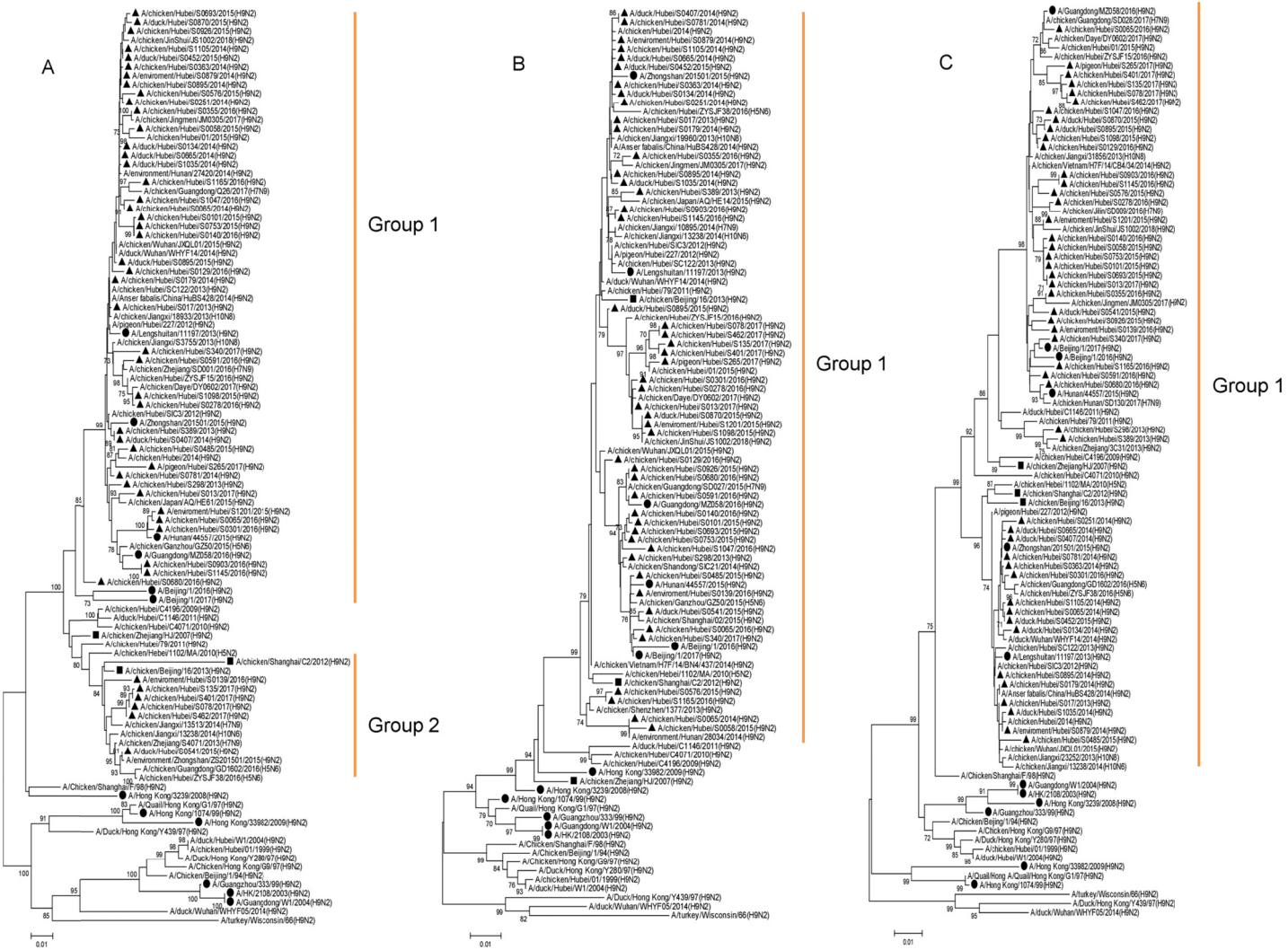
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**Figure S1** Phylogenetic trees of *PB2* (A), *PBI* (B) and *PA* (C) genes of H9N2 avian influenza viruses collected from live poultry markets in Hubei province between 2013 and 2017. Solid triangles indicate the strains isolated in this study, solid circles indicate H9N2 strains caused human infection, solid squares indicate genotype 57 strains. For each node, bootstraps  $\geq 70\%$  are shown.



**Figure S2** Phylogenetic trees for *NP* (A), *M* (B) and *NS* (C) genes of H9N2 avian influenza viruses collected from live poultry markets in Hubei province between 2013 and 2017. Solid triangles indicate the strains isolated in this study, solid circles indicate H9N2 strains caused human infection, solid squares indicate genotype 57 strains. For each node, bootstraps  $\geq 70\%$  are shown.

Supplementary Table S1. 48 H9N2 avian influenza viruses isolated in LPMs in Hubei during 2013-2017

Virus name(Genotype)	City	Sampling time	Genotype	GenBank accession number							
				PB2	PB1	PA	HA	NP	NA	M	NS
A/chicken/Hubei/S017/2013	Wuhan	10/2013	G03	MN647187	MN647188	MN647189	MN647190	MN647191	MN647192	MN647193	MN647194
A/chicken/Hubei/S298/2013	Shiyan	11/2013	G02	MN647379	MN647380	MN647381	MN647382	MN647383	MN647384	MN647385	MN647386
A/chicken/Hubei/S389/2013	Jingmen	11/2013	G01	MN647395	MN647396	MN647397	MN647398	MN647399	MN647400	MN647401	MN647402
A/chicken/Hubei/S0065/2014	Ezhou	2/2014	G05	MN647139	MN647140	MN647141	MN647142	MN647143	MN647144	MN647145	MN647146
A/duck/Hubei/S0134/2014	Ezhou	2/2014	G05	MN647419	MN647420	MN647421	MN647422	MN647423	MN647424	MN647425	MN647426
A/chicken/Hubei/S0179/2014	Huangshi	2/2014	G03	MN647195	MN647196	MN647197	MN647198	MN647199	MN647200	MN647201	MN647202
A/chicken/Hubei/S0251/2014	Huanggang	2/2014	G05	MN647203	MN647204	MN647205	MN647206	MN647207	MN647208	MN647209	MN647210
A/chicken/Hubei/S0363/2014	Wuhan	4/2014	G05	MN647235	MN647236	MN647237	MN647238	MN647239	MN647240	MN647241	MN647242
A/duck/Hubei/S0407/2014	Wuhan	4/2014	G05	MN647427	MN647428	MN647429	MN647430	MN647431	MN647432	MN647433	MN647434
A/duck/Hubei/S0665/2014	Xiangyang	4/2014	G05	MN647451	MN647452	MN647453	MN647454	MN647455	MN647456	MN647457	MN647458
A/chicken/Hubei/S0781/2014	Ezhou	10/2014	G05	MN647299	MN647300	MN647301	MN647302	MN647303	MN647304	MN647305	MN647306
A/environment/Hubei/S0879/2014	Ezhou	10/2014	G05	MN647491	MN647492	MN647493	MN647494	MN647495	MN647496	MN647497	MN647498
A/chicken/Hubei/S0895/2014	Huangshi	10/2014	G05	MN647307	MN647308	MN647309	MN647310	MN647311	MN647312	MN647313	MN647314
A/duck/Hubei/S1035/2014	Huangshi	10/2014	G05	MN647475	MN647476	MN647477	MN647478	MN647479	MN647480	MN647481	MN647482
A/chicken/Hubei/S1105/2014	Huanggang	10/2014	G05	MN647347	MN647348	MN647349	MN647350	MN647351	MN647352	MN647353	MN647354
A/chicken/Hubei/S0058/2015	Jingzhou	1/2015	G05	MN647131	MN647132	MN647133	MN647134	MN647135	MN647136	MN647137	MN647138
A/chicken/Hubei/S0101/2015	Jingzhou	1/2015	G05	MN647155	MN647156	MN647157	MN647158	MN647159	MN647160	MN647161	MN647162
A/chicken/Hubei/S0485/2015	Ezhou	4/2015	G05	MN647243	MN647244	MN647245	MN647246	MN647247	MN647248	MN647249	MN647250
A/duck/Hubei/S0452/2015	Ezhou	4/2015	G05	MN647435	MN647436	MN647437	MN647438	MN647439	MN647440	MN647441	MN647442
A/duck/Hubei/S0541/2015	Huangshi	4/2015	G10	MN647443	MN647444	MN647445	MN647446	MN647447	MN647448	MN647449	MN647450
A/chicken/Hubei/S0576/2015	Xianning	4/2015	G09	MN647251	MN647252	MN647253	MN647254	MN647255	MN647256	MN647257	MN647258
A/chicken/Hubei/S0693/2015	Yichang	11/2015	G09	MN647275	MN647276	MN647277	MN647278	MN647279	MN647280	MN647281	MN647282
A/chicken/Hubei/S0753/2015	Yichang	11/2015	G05	MN647283	MN647284	MN647285	MN647286	MN647287	MN647288	MN647289	MN647290
A/duck/Hubei/S0870/2015	Wuhan	11/2015	G08	MN647459	MN647460	MN647461	MN647462	MN647463	MN647464	MN647465	MN647466
A/duck/Hubei/S0895/2015	Wuhan	11/2015	G08	MN647467	MN647468	MN647469	MN647470	MN647471	MN647472	MN647473	MN647474
A/chicken/Hubei/S0926/2015	Huanggang	11/2015	G05	MN647323	MN647324	MN647325	MN647326	MN647327	MN647328	MN647329	MN647330
A/chicken/Hubei/S1098/2015	Huanggang	11/2015	G03	MN647339	MN647340	MN647341	MN647342	MN647343	MN647344	MN647345	MN647346
A/environment/Hubei/S1201/2015	Huanggang	11/2015	G03	MN647499	MN647500	MN647501	MN647502	MN647503	MN647504	MN647505	MN647506

A/chicken/Hubei/S0065/2016	Huanggang	3/2016	G08	MN647147	MN647148	MN647149	MN647150	MN647151	MN647152	MN647153	MN647154
A/environment/Hubei/S0139/2016	Huanggang	3/2016	G06	MN647483	MN647484	MN647485	MN647486	MN647487	MN647488	MN647489	MN647490
A/chicken/Hubei/S0129/2016	Jingzhou	3/2016	G05	MN647163	MN647164	MN647165	MN647166	MN647167	MN647168	MN647169	MN647170
A/chicken/Hubei/S0140/2016	Jingzhou	3/2016	G05	MN647179	MN647180	MN647181	MN647182	MN647183	MN647184	MN647185	MN647186
A/chicken/Hubei/S0355/2016	Jingzhou	3/2016	G07	MN647227	MN647228	MN647229	MN647230	MN647231	MN647232	MN647233	MN647234
A/chicken/Hubei/S0278/2016	Xiaogan	3/2016	G09	MN647211	MN647212	MN647213	MN647214	MN647215	MN647216	MN647217	MN647218
A/chicken/Hubei/S0301/2016	Xiaogan	3/2016	G09	MN647219	MN647220	MN647221	MN647222	MN647223	MN647224	MN647225	MN647226
A/chicken/Hubei/S1165/2016	Ezhou	3/2016	G05	MN647363	MN647364	MN647365	MN647366	MN647367	MN647368	MN647369	MN647370
A/chicken/Hubei/S0591/2016	Huangshi	4/2016	G04	MN647259	MN647260	MN647261	MN647262	MN647263	MN647264	MN647265	MN647266
A/chicken/Hubei/S0680/2016	Huangshi	4/2016	G09	MN647267	MN647268	MN647269	MN647270	MN647271	MN647272	MN647273	MN647274
A/chicken/Hubei/S0903/2016	Jingmen	4/2016	G04	MN647315	MN647316	MN647317	MN647318	MN647319	MN647320	MN647321	MN647322
A/chicken/Hubei/S1047/2016	Xiangyang	10/2016	G05	MN647331	MN647332	MN647333	MN647334	MN647335	MN647336	MN647337	MN647338
A/chicken/Hubei/S1145/2016	Wuhan	10/2016	G04	MN647355	MN647356	MN647357	MN647358	MN647359	MN647360	MN647361	MN647362
A/chicken/Hubei/S013/2017	Xianning	10/2017	G08	MN647171	MN647172	MN647173	MN647174	MN647175	MN647176	MN647177	MN647178
A/chicken/Hubei/S078/2017	Wuhan	11/2017	G10	MN647291	MN647292	MN647293	MN647294	MN647295	MN647296	MN647297	MN647298
A/chicken/Hubei/S135/2017	Wuhan	11/2017	G10	MN647371	MN647372	MN647373	MN647374	MN647375	MN647376	MN647377	MN647378
A/pigeon/Hubei/S265/2017	Wuhan	11/2017	G09	MN647507	MN647508	MN647509	MN647510	MN647511	MN647512	MN647513	MN647514
A/chicken/Hubei/S340/2017	Huanggang	11/2017	G09	MN647387	MN647388	MN647389	MN647390	MN647391	MN647392	MN647393	MN647394
A/chicken/Hubei/S401/2017	Huanggang	11/2017	G10	MN647403	MN647404	MN647405	MN647406	MN647407	MN647408	MN647409	MN647410
A/chicken/Hubei/S462/2017	Huangshi	11/2017	G10	MN647411	MN647412	MN647413	MN647414	MN647415	MN647416	MN647417	MN647418

\*PB2, polymerase basic 2; PB1, polymerase basic 1; PA, polymerase acidic; HA, hemagglutinin; NP, nucleoprotein; NA, neuraminidase; M, matrix; NS, nonstructural.

Table S2 (A) Molecular characteristics of 48 H9N2 avian influenza viruses isolated in LPMs in Hubei Province.

Virus name	HA																	
	Receptor binding site (H3 numbering)							Cleavage site		Potential glycosylation site								
	S138A	I155T	H183N	A190V/T	Q226L	227M	G228S	333-341		29-31	82-84	141-143	218-220	298-300	305-307	313-315	492-494	551-553
A/chicken/Hubei/S017/2013	A	T	N	A	L	M	G	PSRSSR/GLF		NST	NPS	NVS	NRT	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S298/2013	A	T	N	A	L	M	G	PSRSSR/GLF		NST	NPS	NVS	NRT	NTT	NVS	NCS	NGT	NGS

A/chicken/Hubei/S389/2013	A	T	N	V	L	M	G	PSRSSR/GLF	NST	NPS	NVS	NRT	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0065/2014	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/duck/Hubei/S0134/2014	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	NRT	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0179/2014	A	T	N	A	L	M	G	PSRSSR/GLF	NST	NPS	NVS	NRT	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0251/2014	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0363/2014	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/duck/Hubei/S0407/2014	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/duck/Hubei/S0665/2014	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0781/2014	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/enviroment/Hubei/S0879/2014	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0895/2014	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/duck/Hubei/S1035/2014	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S1105/2014	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0058/2015	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0101/2015	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0485/2015	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/duck/Hubei/S0452/2015	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/duck/Hubei/S0541/2015	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0576/2015	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0693/2015	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0753/2015	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/duck/Hubei/S0870/2015	A	T	N	A	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/duck/Hubei/S0895/2015	A	T	N	A	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0926/2015	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S1098/2015	A	T	N	A	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/enviroment/Hubei/S1201/2015	A	T	N	A	L	M	G	PSRSSR/GLF	NST	NPS	NVS	NRT	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0065/2016	A	T	N	A	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/enviroment/Hubei/S0139/2016	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0129/2016	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0140/2016	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0355/2016	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0278/2016	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS

A/chicken/Hubei/S0301/2016	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S1165/2016	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0591/2016	A	T	N	A	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0680/2016	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S0903/2016	A	T	N	V	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S1047/2016	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S1145/2016	A	T	N	A	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S013/2017	A	T	N	A	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S078/2017	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S135/2017	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/pigeon/Hubei/S265/2017	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S340/2017	A	T	N	A	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S401/2017	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/chicken/Hubei/S462/2017	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/Hong Kong/1074/1999	A	T	N	E	L	Q	G	PARSSR/GLF	NST	NPS	NVT	NRT	NST	NIS	-	NGT	NGS
A/Guangzhou/333/99	A	T	N	V	M	Q	G	PARSSR/GLF	-	NPS	NVT	-	NTT	NVS	-	NGT	-
A/HK/2018/2003	A	T	N	V	L	Q	G	PARSSR/GLF	NST	NPS	NVT	-	NTT	NVS	-	NGT	-
A/Guangdong/W1/2004	A	T	N	V	L	Q	G	PARSSR/GLF	NST	NPS	NVT	-	NTT	NVS	-	NGT	NGS
A/Hong Kong/3239/2008	A	T	N	A	L	Q	G	PSRSSR/GLF	NST	NPS	NVS	NRT	NTT	NVS	NCS	NGT	NGS
A/Hong Kong/33982/2009	S	T	N	D	Q	Q	G	PARSSR/GLF	NST	NPS	NVT	-	NST	NIS	-	NGT	NGS
A/Beijing/1/2016	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/Beijing/1/2017	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/Guangdong/MZ058/2016	A	T	N	T	L	M	G	PARSSR/GLF	-	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/Hunan/44557/2015	A	T	N	T	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/Lengshuitan/11197/2013	A	T	N	T	M	Q	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS
A/Zhongshan/201501/2015	A	T	N	A	L	M	G	PSRSSR/GLF	NST	NPS	NVS	-	NTT	NVS	NCS	NGT	NGS

\*HA, hemagglutinin; A, alanine; C, cysteine; G, glycine; F, phenylalanine; L, leucine; M, methionine; N, asparagine; P, proline; Q, glutamine; R, arginine; S, serine; T, threonine; V, valine; -, none. The background color of the human H9N2 influenza viruses is gray.

Table S2 (B) Molecular characteristics of 48 H9N2 avian influenza viruses isolated in LPMs in Hubei Province.

Virus name	NA			PB2							PB1		PA	M1		M2	NS1	
	Deletion in the stalk	H274Y	R292K	L89V	G309D	R477G	I495V	A588V	E627K/V	D701N	L13P	I368V	A515T	N30D	T215A	S31N	P42S	V149A
A/chicken/Hubei/S017/2013	63-65	H	R	V	D	G	V	V	E	D	P	I	T	D	A	N	S	A
A/chicken/Hubei/S298/2013	63-65	H	R	V	D	G	V	F	E	D	P	I	T	D	A	N	S	A
A/chicken/Hubei/S389/2013	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0065/2014	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/duck/Hubei/S0134/2014	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0179/2014	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0251/2014	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0363/2014	63-65	H	R	V	D	G	V	I	E	D	P	V	T	D	A	N	S	A
A/duck/Hubei/S0407/2014	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/duck/Hubei/S0665/2014	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0781/2014	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/enviroment/Hubei/S0879/2014	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0895/2014	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/duck/Hubei/S1035/2014	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S1105/2014	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0058/2015	63-65	H	R	V	D	G	V	V	E	D	P	I	T	D	A	N	S	A
A/chicken/Hubei/S0101/2015	63-65	H	R	V	D	G	V	A	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0485/2015	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/duck/Hubei/S0452/2015	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/duck/Hubei/S0541/2015	63-65	H	R	V	D	G	V	A	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0576/2015	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0693/2015	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0753/2015	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/duck/Hubei/S0870/2015	63-65	H	R	V	D	G	V	V	V	D	P	V	T	D	A	N	S	A
A/duck/Hubei/S0895/2015	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0926/2015	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S1098/2015	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/enviroment/Hubei/S1201/2015	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A



A/chicken/Hubei/S0065/2016	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/enviroment/Hubei/S0139/2016	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0129/2016	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0140/2016	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0355/2016	63-65	H	R	V	D	G	V	V	E	D	P	I	T	D	A	N	S	A
A/chicken/Hubei/S0278/2016	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0301/2016	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S1165/2016	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0591/2016	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0680/2016	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S0903/2016	63-65	H	R	V	D	G	V	V	V	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S1047/2016	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S1145/2016	63-65	H	R	V	D	G	V	V	V	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S013/2017	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S078/2017	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S135/2017	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/pigeon/Hubei/S265/2017	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S340/2017	63-65	H	R	V	D	G	V	V	V	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S401/2017	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/chicken/Hubei/S462/2017	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/Hong Kong/1074/1999	-	H	R	V	D	G	V	A	E	D	P	I	T	D	A	S	S	A
A/Guangzhou/333/99	-	H	R	V	D	G	V	A	E	D	P	I	T	D	A	S	S	A
A/HK/2018/2003	-	H	R	V	D	G	V	A	E	D	P	I	T	D	A	S	S	A
A/Guangdong/W1/2004	-	H	R	V	D	G	V	A	E	D	P	I	T	D	A	S	S	A
A/Hong Kong/3239/2008	-	H	R	V	D	G	V	A	E	D	P	I	T	D	A	S	S	A
A/Hong Kong/33982/2009	-	H	R	V	D	G	V	A	E	N	P	I	T	D	A	S	S	A
A/Beijing/1/2016	63-65	H	R	V	D	G	V	V	V	D	P	V	T	D	A	N	S	A
A/Beijing/1/2017	63-65	H	R	V	D	G	V	V	V	D	P	V	T	D	A	N	S	A
A/Guangdong/MZ058/2016	63-65	H	R	V	D	G	V	V	K	D	P	V	T	D	A	N	S	A
A/Hunan/44557/2015	63-65	H	R	V	D	G	V	A	E	D	P	V	T	D	A	N	S	A
A/Lengshuitan/11197/2013	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A
A/Zhongshan/201501/2015	63-65	H	R	V	D	G	V	V	E	D	P	V	T	D	A	N	S	A

\*PB2, polymerase basic 2; PB1, polymerase basic 1; PA, polymerase acidic; NP, nucleoprotein; NA, neuraminidase; M, matrix; NS, nonstructural; A, alanine; C, cysteine; D, aspartic acid; G, glycine; E, glutamic acid; F, phenylalanine; H, histidine; I, isoleucine; K, lysine; L, leucine; M, methionine; N, asparagine; P, proline; Q, glutamine; R, arginine; S, serine; T, threonine; V, valine; -, none. The background color of the human H9N2 influenza viruses is gray.