

# Westward Spread of Highly Pathogenic Avian Influenza A(H7N9) Virus among Humans, China

## Technical Appendix

**Technical Appendix Table 1.** Sampling information of all environmental samples.

City	Sample type	No. samples from farms	No. samples from LPMs
Baoji	Total	0	70
	H5-positive	0	1
	H7N9-positive	0	3
	H9-positive	0	4
Xi'an	Total	0	209
	H7N9-positive	0	11
Xianyang	Total	192	0
	H9-positive	5	0
Yulin	Total	25	0
	H7N9-positive	16	0
	H9-positive	1	0

**Technical Appendix Table 2.** Genotypes of all viruses newly isolated in Shaanxi Province in this study\*

Sequence	HA	NA	PB2	PB1	PA	NP	M	NS
A/Shaanxi/XY1/2017	Clade W2-C	Clade W2-C	Clade 1	Clade 2	Clade 2	Clade 1	Clade 2	Clade 1
A/Shaanxi/XY2/2017	Clade W2-C	Clade W2-C				Clade 1	Clade 2	Clade 1
A/Shaanxi/BJ1/2017	Clade W2-C	Clade W2-C	Clade 1	Clade 1	Clade 2	Clade 1	Clade 2	Clade 1
A/Shaanxi/XA1/2017	Clade W2-C	Clade W2-C	Clade 1	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Shaanxi/YL1/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/XA1/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/XA2/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/BJ1/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/BJ2/2017	Clade W2-C	Clade W2-C						
A/Environment/Shaanxi/YL1/2017	Clade W2-C							
A/Environment/Shaanxi/XA4/2017 <mixed>	Clade W2-C	Clade W2-C	Clade 1	Clade 1	Clade 2	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL2/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL3/2017								Clade 1

Sequence	HA	NA	PB2	PB1	PA	NP	M	NS
A/Environment/Shaanxi/YL4/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL5/2017							Clade 2	
A/Environment/Shaanxi/YL6/2017	Clade W2-C	W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL7/2017		Clade W2-C	Clade 2			Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL8/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL9/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL10/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL11/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL12/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL13/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL14/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1		Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL15/2017	Clade W2-C	Clade W2-C	Clade 2		Clade 1	Clade 1	Clade 2	Clade 1
A/Environment/Shaanxi/YL16/2017	Clade W2-C	Clade W2-C	Clade 2	Clade 1	Clade 1	Clade 1	Clade 2	Clade 1

\*Blank cells indicate no nucleotide sequence was obtained. HA, hemagglutinin; NA, neuraminidase; PB, polybasic; PA, polymerase acidic; NP, nucleoprotein; M, matrix protein; NS, nonstructural protein. Abbreviations in the sequences indicate origins: XY, Xianyang; BJ, Baoj; XA, Xi'an; YL, Yulin.

**Technical Appendix Table 3.** Accession numbers of the GISAID and GenBank sequences used in this study.

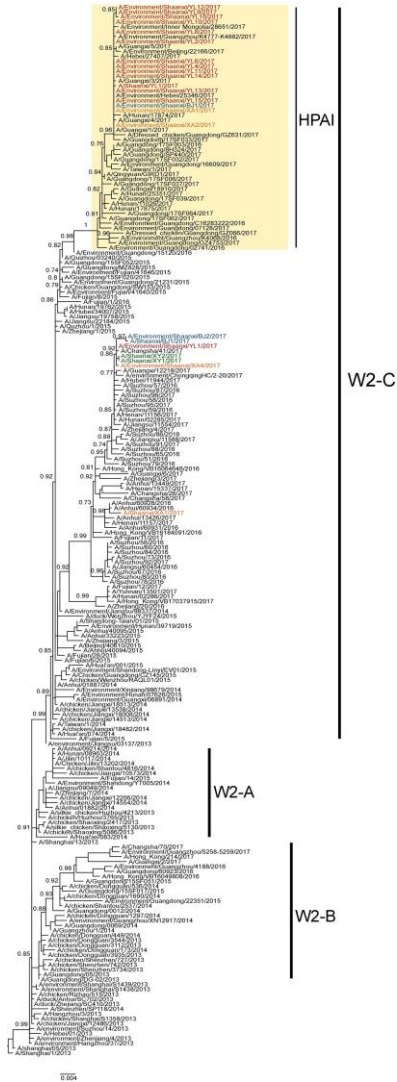
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Gene	Accession numbers
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PB2 (33% H9N2, 67% H7N9)	EPI_ISL_258010, EPI_ISL_242883, EPI_ISL_242861, EPI_ISL_729800, EPI_ISL_269517, EPI_ISL_257986, EPI_ISL_283496, EPI_ISL_257989, EPI_ISL_242901, EPI_ISL_192469, EPI_ISL_192471, EPI_ISL_242862, EPI_ISL_242881, EPI_ISL_257988, EPI_ISL_258007, EPI_ISL_242843, EPI_ISL_242890, EPI_ISL_212471, EPI_ISL_942257, EPI_ISL_683192, EPI_ISL_269515, EPI_ISL_258035, EPI_ISL_258028, EPI_ISL_273302, EPI_ISL_258009, EPI_ISL_283495, EPI_ISL_242845, EPI_ISL_239994, EPI_ISL_257994, EPI_ISL_192478, EPI_ISL_599387, EPI_ISL_192490, EPI_ISL_192300, EPI_ISL_599430, EPI_ISL_192477, EPI_ISL_172824, EPI_ISL_192502, EPI_ISL_141165, EPI_ISL_141166, EPI_ISL_141166, EPI_ISL_175604, EPI_ISL_146186, EPI_ISL_142916, EPI_ISL_192451, EPI_ISL_194370, EPI_ISL_192489, EPI_ISL_223673, EPI_ISL_162874, EPI_ISL_142905, EPI_ISL_192395, EPI_ISL_176207, EPI_ISL_176171, EPI_ISL_283482, EPI_ISL_175642, EPI_ISL_192429,

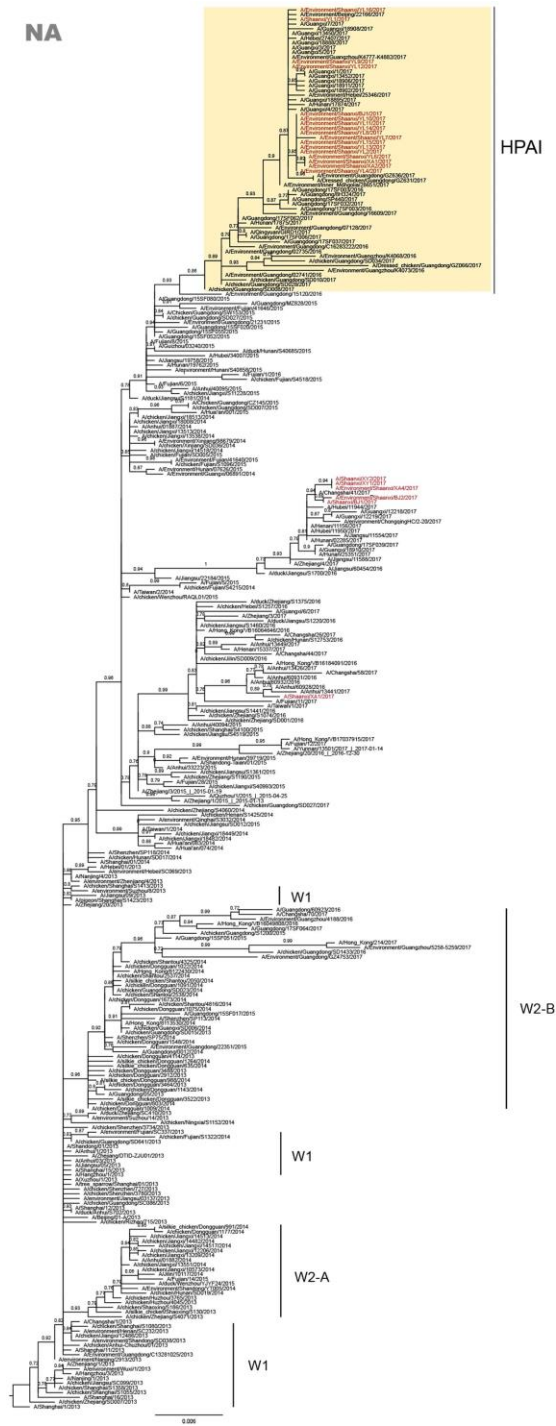
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<p>PB1 (25% H9N2, 75% H7N9)</p>	<p>EPI_ISL_140356, EPI_ISL_139499, EPI_ISL_141183, EPI_ISL_141179, EPI_ISL_141159, EPI_ISL_141158, EPI_ISL_141776, EPI_ISL_142916, EPI_ISL_142922, EPI_ISL_142923, EPI_ISL_146186, EPI_ISL_146876, EPI_ISL_148727, EPI_ISL_151417, EPI_ISL_153011, EPI_ISL_154827, EPI_ISL_161670, EPI_ISL_161675, EPI_ISL_162470, EPI_ISL_163998, EPI_ISL_166324, EPI_ISL_172827, EPI_ISL_175604, EPI_ISL_175641, EPI_ISL_176439, EPI_ISL_176442, EPI_ISL_176417, EPI_ISL_176820, EPI_ISL_175649, EPI_ISL_175737, EPI_ISL_175792, EPI_ISL_179859, EPI_ISL_180078, EPI_ISL_180088, EPI_ISL_180103, EPI_ISL_176114, EPI_ISL_176196, EPI_ISL_176203, EPI_ISL_176207, EPI_ISL_176285, EPI_ISL_192287, EPI_ISL_192289, EPI_ISL_192297, EPI_ISL_192301, EPI_ISL_192335, EPI_ISL_192356, EPI_ISL_192378, EPI_ISL_192387, EPI_ISL_192412, EPI_ISL_192440, EPI_ISL_192470, EPI_ISL_192471, EPI_ISL_192482, EPI_ISL_192485, EPI_ISL_192493, EPI_ISL_194370, EPI_ISL_205123, EPI_ISL_205125, EPI_ISL_206707, EPI_ISL_212471, EPI_ISL_215688, EPI_ISL_217947, EPI_ISL_233629, EPI_ISL_240829, EPI_ISL_242847, EPI_ISL_242853, EPI_ISL_242854, EPI_ISL_242856, EPI_ISL_242865, EPI_ISL_242866, EPI_ISL_242869, EPI_ISL_242873, EPI_ISL_242882, EPI_ISL_242885, EPI_ISL_242890, EPI_ISL_242891, EPI_ISL_242897, EPI_ISL_242901, EPI_ISL_244621, EPI_ISL_248778, EPI_ISL_249102, EPI_ISL_252837, EPI_ISL_257981, EPI_ISL_257983, EPI_ISL_257987, EPI_ISL_257990, EPI_ISL_257994, EPI_ISL_257995, EPI_ISL_258008, EPI_ISL_258010, EPI_ISL_258014, EPI_ISL_258017, EPI_ISL_258028, EPI_ISL_267755, EPI_ISL_267759, EPI_ISL_267761, EPI_ISL_267764, EPI_ISL_268506, EPI_ISL_268507, EPI_ISL_268508, EPI_ISL_268512, EPI_ISL_268525, EPI_ISL_269510, EPI_ISL_269511, EPI_ISL_269514, EPI_ISL_269516, EPI_ISL_269517, EPI_ISL_269518, EPI_ISL_269519, EPI_ISL_269520, EPI_ISL_269521, EPI_ISL_269522, EPI_ISL_273350, EPI_ISL_273950, EPI_ISL_277046, EPI_ISL_277048, EPI_ISL_277050, EPI_ISL_273302, EPI_ISL_283473, EPI_ISL_283475, EPI_ISL_283477, EPI_ISL_283480, EPI_ISL_283493, EPI_ISL_283496, EPI_ISL_283502, EPI_ISL_283505, EPI_ISL_283507, EPI_ISL_283511, EPI_ISL_283515, EPI_ISL_283521, EPI_ISL_283522, EPI_ISL_283526, EPI_ISL_283532, EPI_ISL_283533, EPI_ISL_283539, EPI_ISL_283541, EPI_ISL_283542, EPI_ISL_283546, EPI_ISL_283553, EPI_ISL_283552, EPI_ISL_578197, EPI_ISL_583690, EPI_ISL_583739, EPI_ISL_683148, EPI_ISL_838012, EPI_ISL_844496, EPI_ISL_844500, EPI_ISL_846037, EPI_ISL_942235, EPI_ISL_1034489, AF508632, AF156422, AY253751, AF508634, AF523442, CY043862, CY055154, AF156421, KC464596, JN222386, JN653582, EF063534, CY023638, AF508628, DQ064523, JN869536, CY023734, CY023726, GQ202060, FJ793346, FJ492968, CY023806, JX097036, FJ793386, JN543644, CY038432, CY081261, JF795142, JF795044, EU753320, KC417064, CY087177, JQ356887, JQ356889, FJ581435, JN869522, AB473938, HQ221704, JX437686, JQ901620, JF745929, CY041272, EF155360</p>
<p>PA (32% H9N2, 68% H7N9)</p>	<p>EPI_ISL_138983, EPI_ISL_139498, EPI_ISL_141188, EPI_ISL_141171, EPI_ISL_142231, EPI_ISL_142858, EPI_ISL_142920, EPI_ISL_142921, EPI_ISL_142922, EPI_ISL_142923, EPI_ISL_145654, EPI_ISL_146185, EPI_ISL_153013, EPI_ISL_153077, EPI_ISL_154828, EPI_ISL_156304, EPI_ISL_157284, EPI_ISL_159478, EPI_ISL_161672, EPI_ISL_162874, EPI_ISL_164002, EPI_ISL_164003, EPI_ISL_164006, EPI_ISL_166324, EPI_ISL_169442, EPI_ISL_172823, EPI_ISL_172825, EPI_ISL_172829, EPI_ISL_173693, EPI_ISL_175596, EPI_ISL_175679, EPI_ISL_175709, EPI_ISL_176043, EPI_ISL_176186, EPI_ISL_176204, EPI_ISL_176835, EPI_ISL_179919, EPI_ISL_180025, EPI_ISL_180088, EPI_ISL_180090, EPI_ISL_190692, EPI_ISL_192278, EPI_ISL_192282, EPI_ISL_192283, EPI_ISL_192285, EPI_ISL_192294, EPI_ISL_192307, EPI_ISL_192311, EPI_ISL_192322, EPI_ISL_192329, EPI_ISL_192357, EPI_ISL_192367, EPI_ISL_192382, EPI_ISL_192384, EPI_ISL_192386, EPI_ISL_192396, EPI_ISL_192399, EPI_ISL_192402, EPI_ISL_192405, EPI_ISL_192412, EPI_ISL_192433, EPI_ISL_192450, EPI_ISL_192452, EPI_ISL_192469, EPI_ISL_192471, EPI_ISL_192478, EPI_ISL_192495, EPI_ISL_192497, EPI_ISL_192499, EPI_ISL_192501, EPI_ISL_267759, EPI_ISL_267761, EPI_ISL_268498, EPI_ISL_268505, EPI_ISL_268507, EPI_ISL_268508, EPI_ISL_268526, EPI_ISL_269510, EPI_ISL_269512, EPI_ISL_269514, EPI_ISL_269517, EPI_ISL_269518, EPI_ISL_269519, EPI_ISL_269520, EPI_ISL_269521,</p>

Gene	Accession numbers
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<p>NP (28% H9N2, 72% H7N9)</p>	<p>EPI_ISL_141185, EPI_ISL_141171, EPI_ISL_142187, EPI_ISL_142306, EPI_ISL_142905, EPI_ISL_142912, EPI_ISL_142921, EPI_ISL_142923, EPI_ISL_146369, EPI_ISL_154827, EPI_ISL_156527, EPI_ISL_157293, EPI_ISL_162618, EPI_ISL_164002, EPI_ISL_155815, EPI_ISL_172823, EPI_ISL_175607, EPI_ISL_175637, EPI_ISL_176431, EPI_ISL_175648, EPI_ISL_175683, EPI_ISL_175732, EPI_ISL_175778, EPI_ISL_179964, EPI_ISL_179982, EPI_ISL_176204, EPI_ISL_176280, EPI_ISL_176282, EPI_ISL_176305, EPI_ISL_176364, EPI_ISL_192278, EPI_ISL_192279, EPI_ISL_192298, EPI_ISL_192384, EPI_ISL_192390, EPI_ISL_192463, EPI_ISL_192468, EPI_ISL_192469, EPI_ISL_192475, EPI_ISL_192501, EPI_ISL_194307, EPI_ISL_194386, EPI_ISL_194388, EPI_ISL_205128, EPI_ISL_206749, EPI_ISL_217947, EPI_ISL_242275, EPI_ISL_242843, EPI_ISL_242865, EPI_ISL_242873, EPI_ISL_242887, EPI_ISL_242890, EPI_ISL_248778, EPI_ISL_249308, EPI_ISL_249309, EPI_ISL_249310, EPI_ISL_256108, EPI_ISL_256109, EPI_ISL_257986, EPI_ISL_257988, EPI_ISL_258007, EPI_ISL_258014, EPI_ISL_258027, EPI_ISL_258409, EPI_ISL_263365, EPI_ISL_267757, EPI_ISL_267758, EPI_ISL_267761, EPI_ISL_267762, EPI_ISL_267763, EPI_ISL_267764, EPI_ISL_268499, EPI_ISL_268500, EPI_ISL_268501, EPI_ISL_268503, EPI_ISL_268506, EPI_ISL_268507, EPI_ISL_268509, EPI_ISL_268512, EPI_ISL_268515, EPI_ISL_268523, EPI_ISL_268524, EPI_ISL_269510, EPI_ISL_269512, EPI_ISL_269514, EPI_ISL_269516, EPI_ISL_269518, EPI_ISL_269519, EPI_ISL_269520, EPI_ISL_269521, EPI_ISL_269522, EPI_ISL_273350, EPI_ISL_273950, EPI_ISL_273952, EPI_ISL_277047, EPI_ISL_277447, EPI_ISL_283497, EPI_ISL_283505, EPI_ISL_283520, EPI_ISL_283521, EPI_ISL_283523, EPI_ISL_283524, EPI_ISL_599552, EPI_ISL_681125, EPI_ISL_846032, AF508610, AF156408, AY253753, AF508612, AF523414, CY043859, CY055157, AF156407, KC464599, JN653630, EF063527, CY023641, AF508606, DQ064438, DQ064442, JN869539, CY023737, CY023729, GQ202062, FJ793349, FJ492973, JN653631, CY023809, FJ793389, JN543594, CY038435, CY120060, GU050557, JF795145, JF795047, EU753323, JF519795, CY087180, JQ356878, JQ356880, FJ581428, JN869524, AB473940, HQ221722, JX437689, JQ901664, JF745932, CY041269, EF155141</p>
<p>M (29% H9N2, 71% H7N9)</p>	<p>EPI_ISL_139649, EPI_ISL_139908, EPI_ISL_141182, EPI_ISL_141160, EPI_ISL_142902, EPI_ISL_142905, EPI_ISL_142908, EPI_ISL_143663, EPI_ISL_146876, EPI_ISL_148299, EPI_ISL_151429, EPI_ISL_157287, EPI_ISL_162470, EPI_ISL_169442, EPI_ISL_172824, EPI_ISL_173033, EPI_ISL_175608, EPI_ISL_175642, EPI_ISL_176417, EPI_ISL_175646, EPI_ISL_175718, EPI_ISL_175726, EPI_ISL_175792, EPI_ISL_179977, EPI_ISL_180023, EPI_ISL_180028, EPI_ISL_176050, EPI_ISL_176132, EPI_ISL_176196, EPI_ISL_176373, EPI_ISL_192283, EPI_ISL_192284, EPI_ISL_192293, EPI_ISL_192298, EPI_ISL_192299, EPI_ISL_192307, EPI_ISL_192308, EPI_ISL_192309, EPI_ISL_192323, EPI_ISL_192333, EPI_ISL_192339, EPI_ISL_192341, EPI_ISL_192344, EPI_ISL_192352, EPI_ISL_192364, EPI_ISL_192392, EPI_ISL_192408, EPI_ISL_192410, EPI_ISL_192435, EPI_ISL_192469, EPI_ISL_192490, EPI_ISL_192499, EPI_ISL_192504, EPI_ISL_194993, EPI_ISL_205124, EPI_ISL_215533, EPI_ISL_239994, EPI_ISL_242275, EPI_ISL_242846, EPI_ISL_242862, EPI_ISL_242875, EPI_ISL_242890, EPI_ISL_257986, EPI_ISL_257988, EPI_ISL_257995, EPI_ISL_258005, EPI_ISL_258007, EPI_ISL_258008, EPI_ISL_258009, EPI_ISL_258018, EPI_ISL_258021, EPI_ISL_258028, EPI_ISL_258035, EPI_ISL_258409, EPI_ISL_267755, EPI_ISL_267759, EPI_ISL_268515, EPI_ISL_268523, EPI_ISL_268525, EPI_ISL_269510, EPI_ISL_269512, EPI_ISL_269516, EPI_ISL_269518, EPI_ISL_269519, EPI_ISL_269520, EPI_ISL_269521, EPI_ISL_269522, EPI_ISL_273353, EPI_ISL_273354, EPI_ISL_273950, EPI_ISL_277046, EPI_ISL_277050, EPI_ISL_277450, EPI_ISL_283475, EPI_ISL_283477, EPI_ISL_283480, EPI_ISL_283496, EPI_ISL_283505, EPI_ISL_283520, EPI_ISL_283532, EPI_ISL_283553, EPI_ISL_469974, EPI_ISL_583328, EPI_ISL_682977, EPI_ISL_682980, EPI_ISL_729782, EPI_ISL_838159, AF508697, AF156464, AY253755, AF508699, AF523493, CY043857, CY055159, AF156463, KC464601, JN222383, JN653662, AF536721, EF063506, CY023643, JN869519, AF508694, DQ064388, JN869541, CY023739, CY023731, GQ202059, FJ793351, EU835749, JN653663, CY023811, FJ793391, CY038437, CY120061, JF795147, JF795049, EU753325, KC417049, CY087182, JQ356890, JQ356892, FJ581432, JN869526, AB473941, HQ221650, JX437684, JQ901686, JF745933, CY041267, EF154995</p>
<p>NS (28% H9N2, 72% H7N9)</p>	<p>EPI_ISL_141177, EPI_ISL_141173, EPI_ISL_141172, EPI_ISL_142859, EPI_ISL_142905, EPI_ISL_142906, EPI_ISL_142908, EPI_ISL_148417, EPI_ISL_159478, EPI_ISL_172818, EPI_ISL_172821, EPI_ISL_172823, EPI_ISL_173693, EPI_ISL_175713, EPI_ISL_175724, EPI_ISL_169131, EPI_ISL_179898, EPI_ISL_179910, EPI_ISL_180073, EPI_ISL_176168,</p>

Gene	Accession numbers
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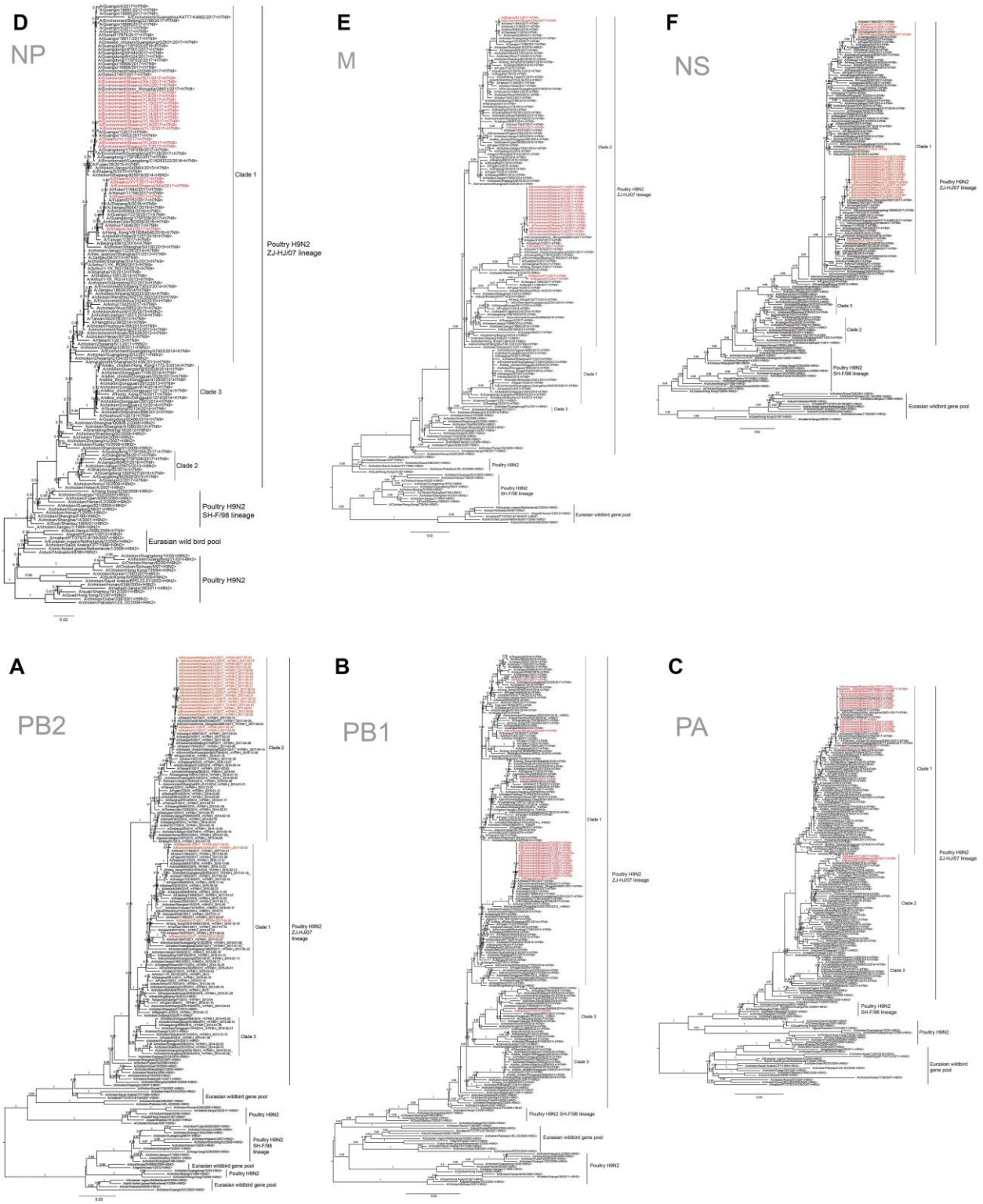


**Technical Appendix Figure 1.** A) Phylogenetic analysis of HA sequences of avian influenza A (H7N9) viruses isolated in Shaanxi province, China, together with reference viruses. Sequence name colors represent the sampling location of the H7N9 viruses obtained in this study: Yulin (red), Xianyang (green), Baoji (blue), and Xi'an (orange). The clade highlighted in yellow contains previously isolated HPAI A (H7N9) viruses. Maximum likelihood phylogenies were estimated by using a GTR+gamma nucleotide substitution model, with Shimodaira-Hasegawa-like local-bootstrap support values for node support (1), as implemented in PhyML v3.1 (2). B) Detail of the HPAI sub-clade highlighted in panel A, with SH-like local-bootstrap support values. Amino acid changes within the HA cleavage site are indicated on basal branches. The LPAI strain A/Environment/Guangdong/15120/2016 is used as an outgroup.



**Technical Appendix Figure 2.** Maximum likelihood phylogenies of the neuraminidase (NA) gene segments. This tree was inferred from NA gene sequences. Taxa colored red are the sequences isolated in this study. Taxa highlighted in yellow are previously isolated highly pathogenic avian influenza (HPAI) A (H7N9) viruses.





**Technical Appendix Figure 3. A)** Maximum likelihood phylogenies of the internal gene segments. This tree was inferred from PB2 gene sequences. Sequences isolated in this study are colored red.

Shimodaira-Hasegawa-like branch support values are shown. Major clades 1–3 of ZJ-HJ/07 lineage of H9N2 viruses are labeled. Poultry H9N2, Poultry H9N2 SH-F/98 lineage and Eurasian wildbird gene pool are labeled as outgroups. **B)** Maximum likelihood phylogenies of the internal gene segments. This tree was inferred from PB1 gene sequences. Sequences isolated in this study are colored red. Shimodaira-Hasegawa-like branch support values are shown. Major clades 1–3 of ZJ-HJ/07 lineage of H9N2 viruses are labeled. Poultry H9N2, Poultry H9N2 SH-F/98 lineage and Eurasian wildbird gene pool are labeled as outgroups. **C)** Maximum likelihood phylogenies of the internal gene segments. This tree was inferred from PA gene sequences. Sequences isolated in this study are colored red. Shimodaira-Hasegawa-like branch support values are shown. Major clades 1–3 of ZJ-HJ/07 lineage of H9N2 viruses are labeled. Poultry H9N2, Poultry H9N2 SH-F/98 lineage and Eurasian wildbird gene pool are labeled as outgroups. **D)** Maximum likelihood phylogenies of the internal gene segments. This tree was inferred from NP gene sequences. Sequences isolated in this study are colored red. Shimodaira-Hasegawa-like branch support values are shown. Major clades 1–3 of ZJ-HJ/07 lineage of H9N2 viruses are labeled. Poultry H9N2, Poultry H9N2 SH-F/98 lineage and Eurasian wildbird gene pool are labeled as outgroups. **E).** Maximum likelihood phylogenies of the internal gene segments. This tree was inferred from M gene sequences. Sequences isolated in this study are colored red. Shimodaira-Hasegawa-like branch support values are shown. Major clades 1–3 of ZJ-HJ/07 lineage of H9N2 viruses are labeled. Poultry H9N2, Poultry H9N2 SH-F/98 lineage and Eurasian wildbird gene pool are labeled as outgroups. **F)** Maximum likelihood phylogenies of the internal gene segments. This tree was inferred from NS gene sequences. Sequences isolated in this study are colored red. Shimodaira-Hasegawa-like branch support values are shown. Major clades 1–3 of ZJ-HJ/07 lineage of H9N2 viruses are labeled. Sequences belonging to Eurasian wildbird gene pool, Poultry H9N2 and Poultry H9N2 SH-F/98 lineage are labeled as outgroups.

## References

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