Figure S1: 26 Gauge cannula attachment to embryonated chicken egg. Opening is closed with nail polish.

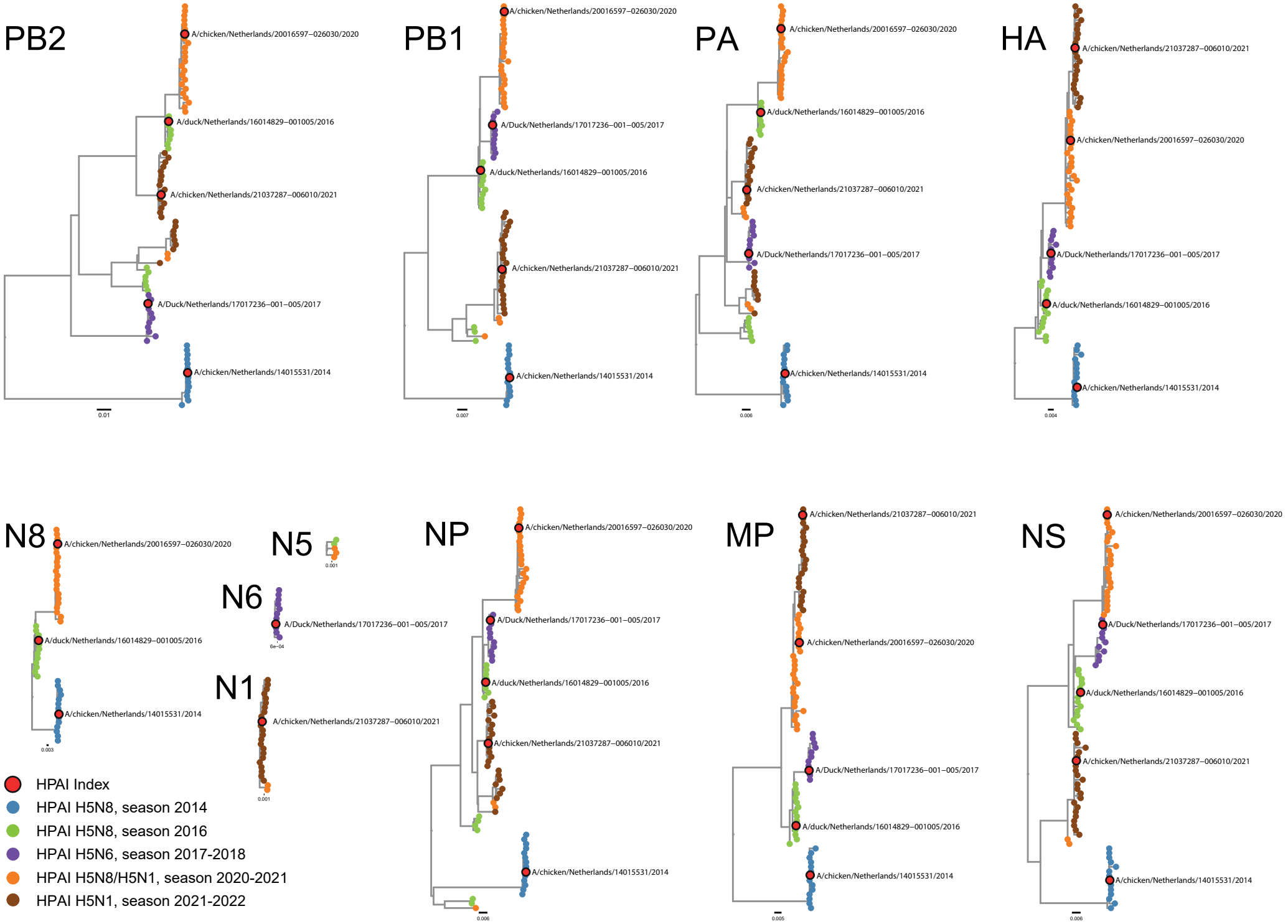

Figure S2: Phylogenetic trees with the strains used in this study and a random selection of AI strains from the different European outbreak seasons (2014 to 2022) inferred using maximum likelihood (ML) methods. Trees are provided for each of the 8 segments. Tips shaded by outbreak season. Additional strains were obtained from the GISAID database (see acknowledgement table S9).

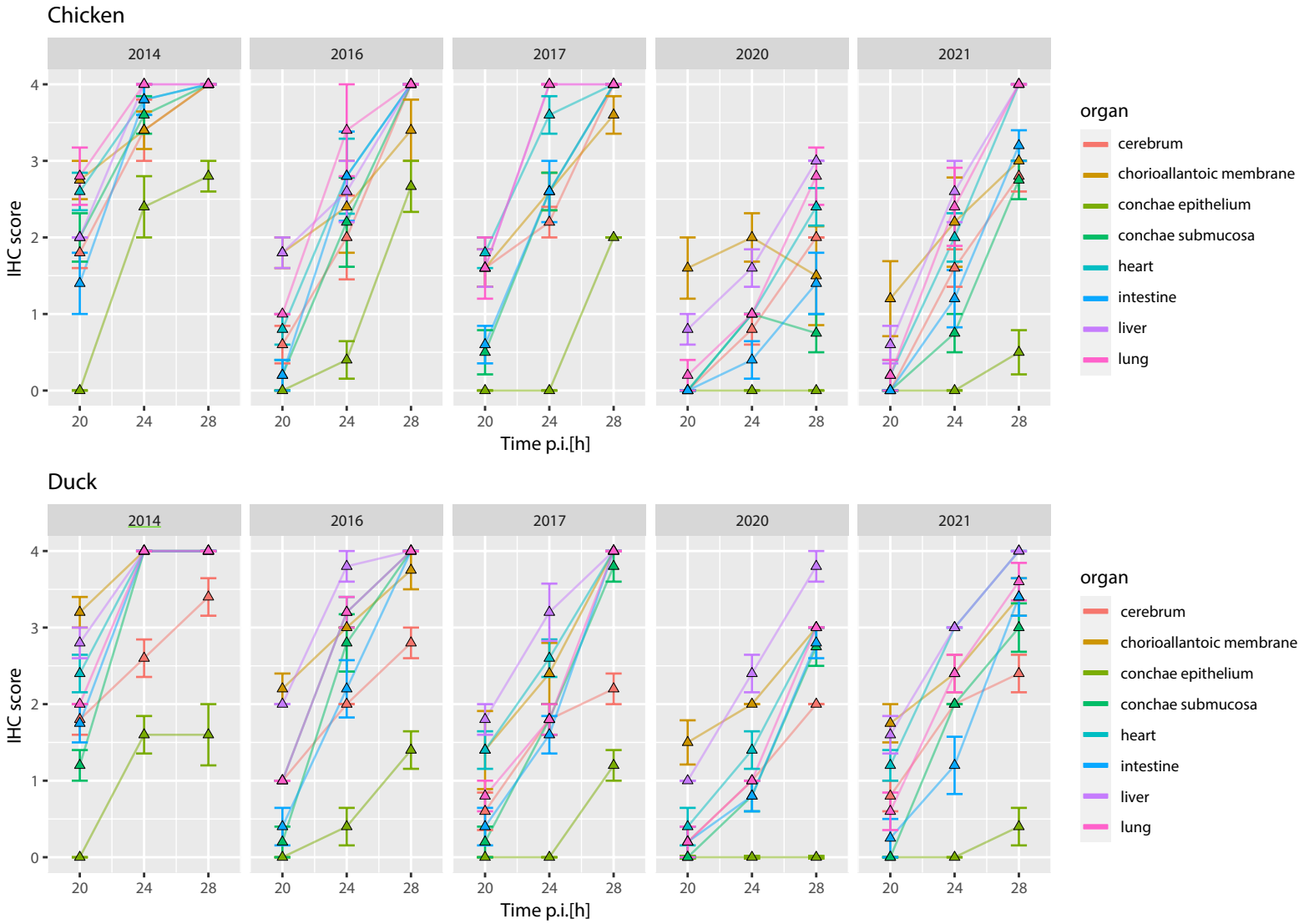

Figure S3: Mean virus antigen score (immunohistochemistry) in embryonic chicken and Pekin duck organs inoculated with five HPAI H5 viruses. Organs are collected at 20 hours , 24 hours and 28 hours post infection *n*=5.

Table S1: Replication in chicken embryo allantoic fluid significance determined by linear regression broken stick model for 0-6 hours post infection and 6-15 hours post infection.

Model	Virus comparison	t-ratio	p-value
Chicken 0h-6h replication	virus2014 - virus2016	3.636	0.0030
Chicken 0h-6h replication	virus2014 - virus2017	2.740	0.0635
Chicken 0h-6h replication	virus2014 - virus2020	3.560	0.0040
Chicken 0h-6h replication	virus2014 - virus2021	2.615	0.0918
Chicken 0h-6h replication	virus2016 - virus2017	-0.865	1.0000
Chicken 0h-6h replication	virus2016 - virus2020	0.003	1.0000
Chicken 0h-6h replication	virus2016 - virus2021	-0.986	1.0000
Chicken 0h-6h replication	virus2017 - virus2020	0.851	1.0000
Chicken 0h-6h replication	virus2017 - virus2021	-0.121	1.0000
Chicken 0h-6h replication	virus2020 - virus2021	-0.969	1.0000
Chicken 6h-15h replication	virus2014 - virus2016	5.555	<.0001
Chicken 6h-15h replication	virus2014 - virus2017	6.783	<.0001
Chicken 6h-15h replication	virus2014 - virus2020	7.165	<.0001
Chicken 6h-15h replication	virus2014 - virus2021	1.274	1.0000
Chicken 6h-15h replication	virus2016 - virus2017	1.186	1.0000
Chicken 6h-15h replication	virus2016 - virus2020	1.673	0.9492
Chicken 6h-15h replication	virus2016 - virus2021	-4.136	0.0004
Chicken 6h-15h replication	virus2017 - virus2020	0.511	1.0000
Chicken 6h-15h replication	virus2017 - virus2021	-5.322	<.0001
Chicken 6h-15h replication	virus2020 - virus2021	-5.726	<.0001

Table S2: Replication in duck embryo allantoic fluid significance determined by linear regression broken stick model for 0-6 hours post infection and 6-15 hours post infection.

Model	Virus comparison	t-ratio	p-value
Duck 0h-6h replication	virus2014 - virus2016	0.706	1.0000
Duck 0h-6h replication	virus2014 - virus2017	0.477	1.0000
Duck 0h-6h replication	virus2014 - virus2020	1.059	1.0000
Duck 0h-6h replication	virus2014 - virus2021	2.023	0.4358
Duck 0h-6h replication	virus2016 - virus2017	-0.226	1.0000
Duck 0h-6h replication	virus2016 - virus2020	0.360	1.0000
Duck 0h-6h replication	virus2016 - virus2021	1.295	1.0000
Duck 0h-6h replication	virus2017 - virus2020	0.582	1.0000
Duck 0h-6h replication	virus2017 - virus2021	1.520	1.0000
Duck 0h-6h replication	virus2020 - virus2021	0.910	1.0000
Duck 6h-15h replication	virus2014 - virus2016	3.444	0.0062
Duck 6h-15h replication	virus2014 - virus2017	6.304	<.0001
Duck 6h-15h replication	virus2014 - virus2020	11.221	<.0001
Duck 6h-15h replication	virus2014 - virus2021	2.020	0.4390
Duck 6h-15h replication	virus2016 - virus2017	2.812	0.0510
Duck 6h-15h replication	virus2016 - virus2020	7.716	<.0001
Duck 6h-15h replication	virus2016 - virus2021	-1.400	1.0000
Duck 6h-15h replication	virus2017 - virus2020	4.957	<.0001
Duck 6h-15h replication	virus2017 - virus2021	-4.213	0.0003
Duck 6h-15h replication	virus2020 - virus2021	-9.090	<.0001

Table S3: The Cox model was used to measure the effect of the differences between chicken embryo survival times of the five HPAI H5-viruses using a Tukey-corrected pairwise comparison .

Virus comparison	t-ratio	p-value
virus2014 - virus2016	5.197	<.0001
virus2014 - virus2017	2.639	0.0634
virus2014 - virus2020	5.144	<.0001
virus2014 - virus2021	2.625	0.0659
virus2016 - virus2017	-2.907	0.0300
virus2016 - virus2020	0.034	1.0000
virus2016 - virus2021	-2.954	0.0261
virus2017 - virus2020	2.875	0.0329
virus2017 - virus2021	0.005	1.0000
virus2020 - virus2021	-2.930	0.0280

Table S4: The Cox model was used to measure the effect of the differences between duck embryo survival times of the five HPAI H5-viruses using a Tukey-corrected pairwise comparison.

Virus comparison	t-ratio	p-value
virus2014 - virus2016	4.732	<.0001
virus2014 - virus2017	4.970	<.0001
virus2014 - virus2020	10.319	<.0001
virus2014 - virus2021	6.494	<.0001
virus2016 - virus2017	0.295	0.9984
virus2016 - virus2020	7.725	<.0001
virus2016 - virus2021	2.658	0.0604
virus2017 - virus2020	7.657	<.0001
virus2017 - virus2021	2.430	0.1073
virus2020 - virus2021	-6.218	<.0001

Table S5: Organ specific method for immunohistochemistry (IHC) and cell type scoring.

Organ	**Scoring method**
Cerebrum IHC score 1	< 5 positive cells on average of 5 microscopic fields with objective 10x
Cerebrum IHC score 2	> 5 -30 positive cell on average of 5 microscopic fields, multifocal staining not coalescent
Cerebrum IHC score 3	Multifocal to coalescent staining of cells, including neuropil (< 50% of neuropil)
Cerebrum IHC score 4	Multifocal to coalescent staining of cells, including neuropil (> 50% of neuropil)
Conchae submucosa IHC score 1	Multifocal staining of individual blood vessel
Conchae submucosa IHC score 2	Multifocal to coalescing staining of individual blood vessels, mainly superficial in mucosa
Conchae submucosa IHC score 3	Diffuse staining of individual blood vessels in superficial and deep mucosa and staining of white blood cells within vessels
Conchae submucosa IHC score 4	Diffuse staining of submucosa and large vessels
Conchae epithelial cells IHC score 1	Staining of few epithelial cells (< 5 foci), mostly individual cells with objective 20x
Conchae epithelial cells IHC score 2	Multifocal staining of individual epithelial cells, but also clusters of 2-5 cells together (< 10 foci)
Conchae epithelial cells IHC score 3	Multifocal staining of individual epithelial cells, but also clusters of 2-5 cells together (> 10 foci)
Conchae epithelial cells IHC score 4	Not evaluated, no tissues with this expression
Lung IHC score 1	< 5 positive cells/foci on average of 5 microscopic fields with objective 10x
Lung IHC score 2	> 5 -30 positive cells/foci on average of 5 microscopic field, multifocal staining not coalescent
Lung IHC score 3	Diffuse staining of endothelial cells
Lung IHC score 4	Diffuse staining of endothelial cells, individual staining cells are difficult to recognize
Heart IHC score 1	< 10 positive cells/foci on average of 5 microscopic fields with objective 10x
Heart IHC score 2	> 10 -50 positive cells/foci on average of 5 microscopic field, multifocal staining not coalescent
Heart IHC score 3	Diffuse staining of endothelial cells and also cardiomyocytes
Heart IHC score 4	Diffuse staining of endothelial cells and also cardiomyocytes, individual staining cells are difficult to recognize
Liver IHC score 1	< 10 positive cells/foci on average of 5 microscopic fields with objective 20x
Liver IHC score 2	> 10 -50 positive cells/foci on average of 5 microscopic field, multifocal staining not coalescent
Liver IHC score 3	Diffuse staining of cells lining sinusoids and in sinusoids
Liver IHC score 4	Diffuse staining of cells lining sinusoids and in sinusoids, also staining of hepatocytes individual staining cells are difficult to recognize

Intestine IHC score 1	< 10 positive cells/foci on average of 5 microscopic fields with objective 20x
Intestine IHC score 2	> 10 -50 positive cells/foci on average of 5 microscopic field, multifocal staining not coalescent, also serosal cells
Intestine IHC score 3	Diffuse staining of serosal cells
Intestine IHC score 4	Diffuse staining of serosal cells, extending to muscular layer
Chorion allantoic membrane IHC score 1	< 5 positive cells/foci on average of 5 microscopic fields with objective 10x
Chorion allantoic membrane IHC score 2	> 5 -30 positive cells/foci on average of 5 microscopic field, multifocal staining not coalescent
Chorion allantoic membrane IHC score 3	Diffuse staining of endothelial cells
Chorion allantoic membrane IHC score 4	Diffuse staining of endothelial cells, individual staining cells are difficult to recognize

Table S6: Chicken embryo virus antigen scores in different organs were grouped according to the best fitting model of the factor analysis followed by a Tukey corrected pairwise comparison.

Model	Virus comparison	t-ratio	p-value
Chicken 20h	virus2014 - virus2016	4.069	0.0017
Chicken 20h	virus2014 - virus2017	2.456	0.1194
Chicken 20h	virus2014 - virus2020	5.678	<.0001
Chicken 20h	virus2014 - virus2021	5.019	0.0001
Chicken 20h	virus2016 - virus2017	-1.481	0.5802
Chicken 20h	virus2016 - virus2020	1.917	0.3236
Chicken 20h	virus2016 - virus2021	1.932	0.3156
Chicken 20h	virus2017 - virus2020	3.223	0.0190
Chicken 20h	virus2017 - virus2021	3.014	0.0327
Chicken 20h	virus2020 - virus2021	0.382	0.9953
Chicken 24h	virus2014 - virus2016	3.790	0.0039
Chicken 24h	virus2014 - virus2017	2.174	0.2080
Chicken 24h	virus2014 - virus2020	6.862	<.0001
Chicken 24h	virus2014 - virus2021	6.595	<.0001
Chicken 24h	virus2016 - virus2017	-1.615	0.4958
Chicken 24h	virus2016 - virus2020	3.998	0.0021
Chicken 24h	virus2016 - virus2021	3.022	0.0320
Chicken 24h	virus2017 - virus2020	5.219	<.0001
Chicken 24h	virus2017 - virus2021	4.545	0.0004
Chicken 24h	virus2020 - virus2021	-1.521	0.5547
Chicken 28h	virus2014 - virus2016	0.012	1.0000
Chicken 28h	virus2014 - virus2017	0.150	0.9999
Chicken 28h	virus2014 - virus2020	6.105	<.0001
Chicken 28h	virus2014 - virus2021	1.821	0.3745
Chicken 28h	virus2016 - virus2017	0.118	1.0000
Chicken 28h	virus2016 - virus2020	5.450	<.0001
Chicken 28h	virus2016 - virus2021	1.588	0.5127
Chicken 28h	virus2017 - virus2020	5.976	<.0001
Chicken 28h	virus2017 - virus2021	1.680	0.4563
Chicken 28h	virus2020 - virus2021	-4.238	0.0010

Table S7: Chicken embryo virus antigen scores in different organs were grouped according to the best fitting model of the factor analysis followed by a Tukey corrected pairwise comparison.

Model	Virus comparison	t-ratio	p-value
Duck 20h	virus2014 - virus2016	4.766	0.0001
Duck 20h	virus2014 - virus2017	5.583	<.0001
Duck 20h	virus2014 - virus2020	7.898	<.0001
Duck 20h	virus2014 - virus2021	6.128	<.0001
Duck 20h	virus2016 - virus2017	0.817	0.9244
Duck 20h	virus2016 - virus2020	3.132	0.0217
Duck 20h	virus2016 - virus2021	1.362	0.6541
Duck 20h	virus2017 - virus2020	2.315	0.1545
Duck 20h	virus2017 - virus2021	0.545	0.9822
Duck 20h	virus2020 - virus2021	-1.770	0.4003
Duck 24h	virus2014 - virus2016	5.174	<.0001
Duck 24h	virus2014 - virus2017	8.851	<.0001
Duck 24h	virus2014 - virus2020	12.800	<.0001
Duck 24h	virus2014 - virus2021	8.306	<.0001
Duck 24h	virus2016 - virus2017	3.677	0.0045
Duck 24h	virus2016 - virus2020	7.625	<.0001
Duck 24h	virus2016 - virus2021	3.132	0.0217
Duck 24h	virus2017 - virus2020	3.949	0.0019
Duck 24h	virus2017 - virus2021	-0.545	0.9822
Duck 24h	virus2020 - virus2021	-4.494	0.0003
Duck 28h	virus2014 - virus2016	2.043	0.2588
Duck 28h	virus2014 - virus2017	1.770	0.4003
Duck 28h	virus2014 - virus2020	6.672	<.0001
Duck 28h	virus2014 - virus2021	3.813	0.0029
Duck 28h	virus2016 - virus2017	-0.272	0.9988
Duck 28h	virus2016 - virus2020	4.630	0.0002
Duck 28h	virus2016 - virus2021	1.770	0.4003
Duck 28h	virus2017 - virus2020	4.902	0.0001
Duck 28h	virus2017 - virus2021	2.043	0.2588
Duck 28h	virus2020 - virus2021	-2.860	0.0444

Table S8: Summary of the largest differences measured for the i*n ovo* models and IVPI in absolute values. Replication rate is summarized from 6 hours to 15 hours post infection. The 50% survival probability is displayed as time to death in hours post infection. Average IHC scores for the eight studied organs is calculated at 24 hours post infection.

Virus	**IVPI chicken**	**Replication rate chicken**	**Time to death chicken**	**IHC chicken**	**IVPI Pekin duck**	**Replication rate Pekin duck**	**Time to death Pekin duck**	**IHC Pekin duck**
H5N8-2014	3	0,354	28,44	3,75	1,87	0,42	24,53	3,5
H5N8-2016	3	0,261	31,21	2,6	2,99	0,364	25,77	2,6
H5N6-2017	2,99	0,241	29,62	2,6	3	0,317	25,86	2
H5N8-2020	2,98	0,232	31,23	1	1,74	0,232	29,84	1
H5N1-2021	3	0,333	29,62	1,75	1,96	0,387	26,78	2

Table S9: GISAID accession numbers.

We gratefully acknowledge the authors, originating and submitting laboratories of the sequences from GISAID's EpiFlu™ Database on which this research is based. The list is detailed below.
All submitters of data may be contacted directly via www.gisaid.org

Isolate-ID	Isolate name	Country	Collection date	Originating Lab	Submitting Lab	Authors
EPI_ISL_167140	A/turkey/Germany-MV/R2472/2014	Germany	2014-11-04		Friedrich-Loeffler-Institut	
EPI_ISL_167904	A/duck/England/36254/14	United Kingdom	2014-11-14	Animal and Plant Health Agency (APHA)	Animal and Plant Health Agency (APHA)	Hanna, Amanda; Ellis, Richard; Ceeraz, Vanessa; Seekings, James; Londt, Brandon; Brookes, Sharon; Banks, Jill; Essen, Stephen; Brown, Ian
EPI_ISL_168075	A/chicken/Netherlands/14015531/2014	Netherlands	2014-11-15	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bouwstra, Ruth
EPI_ISL_331223	A/Duck/England/1279/2014	United Kingdom	2014-11-16	Animal and Plant Health Agency (APHA)	Animal and Plant Health Agency (APHA)	Puranik,Anita; Warren,Caroline; Mahmood,Sahar; Thomas,Saumya; Byrne,Alexander; Ramsay,Andrew; Everett,Helen; Skinner,Paul; Núñez,Alejandro; Watson,Samantha; Slomka,Marek; Brown,Ian; Brookes,Sharon
EPI_ISL_174349	A/chicken/Netherlands/14015766/2014	Netherlands	2014-11-19	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bouwstra, Ruth
EPI_ISL_174350	A/Chicken/Netherlands/14015824/2014	Netherlands	2014-11-20	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bouwstra, Ruth
EPI_ISL_174351	A/duck/Netherlands/14015989/2014	Netherlands	2014-11-21	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bouwstra, Ruth
EPI_ISL_181095	A/chicken/Netherlands/emc-3/2014	Netherlands	2014-11-21			Verhagen,J.H.; Van der Jeugd,H.P.; Nolet,B.A.; Vuong,O.; Majoor,F.; De Vries,P.P.; Kharitonov,S.; Kuiken,T.; Fouchier,R.A.M.
EPI_ISL_181093	A/eurasian wigeon/Netherlands/1/2014	Netherlands	2014-11-24			Verhagen,J.H.; Van der Jeugd,H.P.; Nolet,B.A.; Vuong,O.; Majoor,F.; De Vries,P.P.; Kharitonov,S.; Kuiken,T.; Fouchier,R.A.M.
EPI_ISL_181094	A/eurasian wigeon/Netherlands/2/2014	Netherlands	2014-11-24			Verhagen,J.H.; Van der Jeugd,H.P.; Nolet,B.A.; Vuong,O.; Majoor,F.; De Vries,P.P.; Kharitonov,S.; Kuiken,T.; Fouchier,R.A.M.
EPI_ISL_174352	A/chicken/Netherlands/14016437/2014	Netherlands	2014-11-29	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bouwstra, Ruth
EPI_ISL_169851	A/stork/Germany-MV/R24/2015	Germany	2014-12-01		Friedrich-Loeffler-Institut	
EPI_ISL_169350	A/turkey/Italy/14VIR7898-10/2014	Italy	2014-12-15	Istituto Zooprofilattico Sperimentale Delle Venezie	Istituto Zooprofilattico Sperimentale Delle Venezie	Luca,Tassoni; Silvia,Ormelli; Alessia,Schivo; Alice,Fusaro; Isabella,Monne; Giovanni,Cattoli
EPI_ISL_169351	A/turkey/Germany-NI/R3372/2014	Germany	2014-12-15		Friedrich-Loeffler-Institut	
EPI_ISL_169351	A/turkey/Germany-NI/R3372/2014	Germany	2014-12-15		Friedrich-Loeffler-Institut	
EPI_ISL_239434	A/tufted_duck/Switzerland/V246-L02001/2016	Switzerland	2016-11-01	Institut für Virologie und Immunologie - Bundesamt für Lebensmittelsicherheit und Veterinärwesen	Friedrich-Loeffler-Institut	
EPI_ISL_268675	A/T_Dk/NL-Zeewolde/16013976-001-003/2016	Netherlands	2016-11-09	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bergervoet, Saskia
EPI_ISL_436135	A/chicken/Germany-MV/AR9528-L02970/2016	Germany	2016-11-18	Landesamt für Landwirtschaft, Lebensmittelsicherheit und Fischerei (LALLF)	Friedrich-Loeffler-Institut	
EPI_ISL_238895	A/Chicken/Sweden/SVA161122KU0453/SZ0209 318/2016	Sweden	2016-11-21	Swedish Veterinary Agency (SVA)	Swedish Veterinary Agency (SVA)	
EPI_ISL_529179	A/duck/Netherlands/16014829-001005/2016	Netherlands	2016-11-25	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Heutink, Rene
EPI_ISL_271712	A/Goose/Hungary/63743/2016	Hungary	2016-12-11	National Food Chain Safety Office Veterinary Diagnostic Directorate Laboratory for Molecular Biology	Danam.Vet.Molbiol	Adam, Dan
EPI_ISL_268650	A/Eur_Wig/NL-West Graftdijk/16015746-003/2016	Netherlands	2016-12-12	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bergervoet, Saskia
EPI_ISL_240893	A/swan/Germany-SN/R10645/2016	Germany	2016-12-13		Friedrich-Loeffler-Institut	
EPI_ISL_268635	A/Eur_Wig/NL-Akkrum/16015817-003/2016	Netherlands	2016-12-13	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bergervoet, Saskia
EPI_ISL_268641	A/Eur_Wig/NL-Gouda/16015824-001/2016	Netherlands	2016-12-13	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bergervoet, Saskia

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EPI_ISL_4064461	A/duck/France/161298/2016	France	2016-12-16			Briand,F.-X.; Niqueux,E.; Schmitz,A.; Martenot,C.; Cherbonnel,M.; Kerbrat,F.; Chatel,M.; Quenault,H.; Beven,V.; Leroux,A.; Hirchaud,E.; Lucas,P.; Blanchard,Y.; Grasland,B.
EPI_ISL_4064466	A/duck/France/161449/2016	France	2016-12-22			Briand,F.-X.; Niqueux,E.; Schmitz,A.; Martenot,C.; Cherbonnel,M.; Kerbrat,F.; Chatel,M.; Quenault,H.; Beven,V.; Leroux,A.; Hirchaud,E.; Lucas,P.; Blanchard,Y.; Grasland,B.
EPI_ISL_243085	A/wigeon/Italy/16VIR9616-3/2016	Italy	2016-12-29	Istituto Zooprofilattico Sperimentale Delle Venezie	Istituto Zooprofilattico Sperimentale Delle Venezie	Silvia,Ormelli; Sabrina,Marciano; Alessia,Schivo; Annalisa,Salviato; Adelaide,Milani; Gianpiero,Zamperini; Bianca,Zecchin; Alice,Fusaro; Calogero,Terregino; Isabella,Monne
EPI_ISL_5034851	A/chicken/Poland/115/2016(H5N8)	Poland	2016-12-29	National Veterinary Research Institut Poland, PIWet-PIB	National Veterinary Research Institut Poland, PIWet-PIB	Swieton E., Smietanka K.
EPI_ISL_287906	A/Duck/Netherlands/17017236-001-005/2017	Netherlands	2017-12-07	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bergervoet, Saskia
EPI_ISL_332433	A/Bird/Netherlands/17017775-035-039/2017	Netherlands	2017-12-15	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bergervoet, Saskia
EPI_ISL_292225	A/canada_goose/England/AV58_18OPpoolEP1/2018	United Kingdom	2018-01-05	Animal and Plant Health Agency (APHA)	Animal and Plant Health Agency (APHA)	Seekings, James; Ellis, Richard; Brookes, Sharon M; Reid, Scott; Essen, Stephen; Lewis, Nicola; Brown, Ian H
EPI_ISL_332436	A/Peacock/Netherlands/18000887-006/2018	Netherlands	2018-01-20	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bergervoet, Saskia
EPI_ISL_302823	A/Great black-backed gull/Netherlands/1/2018	Netherlands	2018-01-23	Erasmus Medical Center	Erasmus Medical Center	Poen,MJ; Bestebroer,TM; Vuong,O; Scheuer,RD; Kelder,L; Fouchier,RAM
EPI_ISL_18795093	A/Common buzzard/SVA180307SZ0416/KU000389/K-2018	Sweden	2018-03-07	Swedish Veterinary Agency (SVA)	Swedish Veterinary Agency (SVA)	"Siamak,Zohari"
EPI_ISL_305417	A/Domestic_Duck/Netherlands/EMC-6/2018	Netherlands	2018-03-13	Erasmus Medical Center	Erasmus Medical Center	Poen,MJ; Bestebroer,TM; De Meulder,D; Vuong,O; Scheuer,RD; Netherlands Food and Consumer Product Safety Authority,NVWA;Koopmans,MPG; Fouchier,RAM
EPI_ISL_305454	A/chicken/Germany-SH/AR164-L02543/2018	Germany	2018-03-19		Friedrich-Loeffler-Institut	
EPI_ISL_306989	A/turkey/Germany-SH/AR185-L02549/2018	Germany	2018-03-19		Friedrich-Loeffler-Institut	
EPI_ISL_313226	A/white stork/Germany-NI/AR251/2018	Germany	2018-04-01	Niedersaechsisches Landesgesundheitsamt	Friedrich-Loeffler-Institut	
EPI_ISL_332441	A/Mallard/Netherlands/18012508-017/2018	Netherlands	2018-08-24	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Heutink, Rene; Harders, Frank; Verschuren-Pritz, Sylvia; Bossers, Alex; Koch, Guus; Bergervoet, Saskia
EPI_ISL_654827	A/goose/Omsk/30003/2020	Russian Federation	2020-09-03	State Research Center of Virology and Biotechnology (VECTOR)	State Research Center of Virology and Biotechnology (VECTOR)	Natalia,Goncharova; Ivan,Susloparov; Natalia,Kolosova; Alexey,Danilenko; Juliya,Bulanovich; Vasiliy,Marchenko; Alexander,Ryzhikov
EPI_ISL_654824	A/duck/Saratov/29804/2020	Russian Federation	2020-09-15	State Research Center of Virology and Biotechnology (VECTOR)	State Research Center of Virology and Biotechnology (VECTOR)	Natalia,Goncharova; Ivan,Susloparov; Natalia,Kolosova; Alexey,Danilenko; Juliya,Bulanovich; Vasiliy,Marchenko; Alexander,Ryzhikov
EPI_ISL_5863358	A/mallard/Georgia/DT-22360/2020	Georgia	2020-10-02	Erasmus Medical Center	Royal Veterinary College	Fouchier, R.A.M.; Vuong, O.; Scheuer, R.D.; Lopes, S.; Lewis, N.S.
EPI_ISL_603134	A/Eurasian Wigeon/Netherlands/4/2020	Netherlands	2020-10-16	Erasmus Medical Center	Erasmus Medical Center	
EPI_ISL_603132	A/chicken/Netherlands/20016597-026030/2020	Netherlands	2020-10-28	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Harders, Frank; Verschuren-Pritz, Sylvia; Roose, Marit; Germeraad, Evelien; Engelsma, Marc; Bossers, Alex; Heutink, Rene
EPI_ISL_8650948	A/chicken/Netherlands/20016597-026030/2020	Netherlands	2020-10-28	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Harders, Frank; Pritz-Verschuren, Sylvia; Roose, Marit; Venema, Sandra; Germeraad, Evelien; Engelsma, Marc; Heutink, Rene
EPI_ISL_1139025	A/barnacle goose/Netherlands/20016974-002/2020	Netherlands	2020-11-02	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Harders, Frank; Pritz-Verschuren, Sylvia; Roose, Marit; Germeraad, Evelien; Engelsma, Marc; Bossers, Alex; Heutink, Rene
EPI_ISL_1139082	A/barnacle goose/Netherlands/20016896-011/2020	Netherlands	2020-11-02	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Harders, Frank; Pritz-Verschuren, Sylvia; Roose, Marit; Germeraad, Evelien; Engelsma, Marc; Bossers, Alex; Heutink, Rene
EPI_ISL_1139041	A/greylag goose/Netherlands/20017064-002/2020	Netherlands	2020-11-03	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Harders, Frank; Pritz-Verschuren, Sylvia; Roose, Marit; Germeraad, Evelien; Engelsma, Marc; Bossers, Alex; Heutink, Rene
EPI_ISL_710512	A/whistling_duck/England/035643/2020	United Kingdom	2020-11-19	Animal and Plant Health Agency (APHA)	Animal and Plant Health Agency (APHA)	

EPI_ISL_956409	A/common_teal/Italy/20VIR7439-190/2020	Italy	2020-11-28	Istituto Zooprofilattico Sperimentale delle Venezie, EU/OIE/Reference Laboratory and FAO Reference Centre for AI and ND	Istituto Zooprofilattico Sperimentale Delle Venezie	Zecchin, B.; Fusaro, A.; Milani, A.; Schivo, A.; Salviato, A.; Pastori, A.; Zamperin, G.; Monne, I.; Terregino, C.
EPI_ISL_779129	A/turkey/Poland/464/2020(H5N8)	Poland	2020-12-01	National Veterinary Research Institut Poland, PIWet-PIB	National Veterinary Research Institut Poland, PIWet-PIB	Swieton E., Smietanka K.
EPI_ISL_18718161	A/duck/France/PPNL-20P017941/2020	France	2020-12-10	Ploufragan-Plouzane-Niort Laboratory	Ploufragan-Plouzane-Niort Laboratory	Briand,F.-x., Niqueux,E., Schmitz,A., Martenot,C., Cherbonnel,M., Massin,P., Busson,R., Guillemoto,C., Pierre,I., Louboutin,K., Souchaud,F., Allee,C., Quenault,H., Beven,V., Leroux,A., Lucas,P., Hirchaud,E., Van de Wiele,A., Blanchard,Y., Scoizec,A., LeBouquin,S.; Grasland,B.
EPI_ISL_1039238	A/chicken/Astrakhan/321-09/2020	Russian Federation	2020-12-12	State Research Center of Virology and Biotechnology (VECTOR)	State Research Center of Virology and Biotechnology (VECTOR)	Natalia,Goncharova; Ivan,Susloparov; Natalia,Kolosova; Alexey,Danilenko; Juliya,Bulanovich; Vasiliy,Marchenko; Alexander,Ryzhikov
EPI_ISL_1122425	A/chicken/England/043315/2020	United Kingdom	2020-12-15	Animal and Plant Health Agency (APHA)	Animal and Plant Health Agency (APHA)	
EPI_ISL_846623	A/swan/Poland/MB141/2020(H5N8)	Poland	2020-12-16	National Veterinary Research Institut Poland, PIWet-PIB	National Veterinary Research Institut Poland, PIWet-PIB	Swieton, E.; Smietanka, K.
EPI_ISL_1123351	A/duck/England/043628/2020	United Kingdom	2020-12-18	Animal and Plant Health Agency (APHA)	Animal and Plant Health Agency (APHA)	
EPI_ISL_1665267	A/mute_swan/Slovenia/1914-20_21VIR959-5/2020	Slovenia	2020-12-24	Istituto Zooprofilattico Sperimentale delle Venezie, EU/OIE/Reference Laboratory and FAO Reference Centre for AI and ND	Istituto Zooprofilattico Sperimentale Delle Venezie	Slavec, B.; Racnik, J.; Zorman Rojs, Olga.; Zecchin, B.; Fusaro, A.; Pastori, A.; Schivo, A.; Salviato, A.; Monne, I.; Terregino, C.
EPI_ISL_7622862	A/Anser_brachyrhynchus/Belgium/151/2020	Belgium	2020-12-26	Sciensano - Animal Infectious Diseases	Sciensano, Department of Animal Infectious Diseases	Van Borm, Steven; Vandenbussche, Frank; Roupie, Virginie; Lambrecht, Benedicte; Steensels, Mieke
EPI_ISL_7778769	A/pheasant/Finland/499_21VIR7689-1/2021	Finland	2021-01-01	Finnish Food Authority	Istituto Zooprofilattico Sperimentale Delle Venezie	Tammiranta, N.; Kantala, T.; Laamanen, I.; Gadd, T.; Zecchin, B.; Fusaro, A.; Schivo, A.; Salviato, A.; Palumbo, E.; Milani, A.; Giussani, E.; Pastori, A.; Monne, I.; Terregino, C.
EPI_ISL_775267	A/turkey/Netherlands/21020942-001005/2021	Netherlands	2021-01-04	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Harders, Frank; Pritz-Verschuren, Sylvia; Roose, Marit; Germeraad, Evelien; Engelsma, Marc; Bossers, Alex; Heutink, Rene
EPI_ISL_5095321	A/turkey/Germany-NI/AI00429/2021	Germany	2021-01-08	Lebensmittel- und Veterinärinstitut Oldenburg - Standort Veterinärinstitut	Friedrich-Loeffler-Institut	
EPI_ISL_943555	A/Chicken/Sweden/SVA210117SZ0004/KN011321/2021	Sweden	2021-01-16	Swedish Veterinary Agency (SVA)	Swedish Veterinary Agency (SVA)	
EPI_ISL_7778760	A/mute_swan/Estonia/TA2106615_21VIR7512-4/2021	Estonia	2021-03-04	Estonian Veterinary and Food Laboratory	Istituto Zooprofilattico Sperimentale Delle Venezie	Nurmoja, I.; Vilem, A.; Juurik, T.; Zecchin, B.; Fusaro, A.; Schivo, A.; Salviato, A.; Palumbo, E.; Milani, A.; Giussani, E.; Pastori, A.; Monne, I.; Terregino, C.
EPI_ISL_1697187	A/chicken/Czech Republic/6542-1/2021	Czech Republic	2021-04-03	State Veterinary Institute Prague	State Veterinary Institute Prague	Nagy,A;Cernikova,L;Stara,M
EPI_ISL_18458048	A/chicken/Lithuania/4525_21VIR3369-3/2021	Lithuania	2021-04-25	Lithuanian National Food and Veterinary Risk Assessment Institute (NFVRAI)	Istituto Zooprofilattico Sperimentale Delle Venezie	Pileviciene, S.;Janeliunas, Z.;Zecchin, B.;Pastori, A.;Fusaro, A.;Schivo, A.;Salviato, A.;Palumbo, E.;Giussani, E.;Monne, I.;Terregino, C.
EPI_ISL_7753173	A/Eurasian wigeon/Germany-SH/AI05956/2021	Germany	2021-10-14	Landeslabor Schleswig-Holstein	Friedrich-Loeffler-Institut	
EPI_ISL_9856775	A/chicken/Netherlands/21037287-006010/2021	Netherlands	2021-10-25	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Harders, Frank; Pritz-Verschuren, Sylvia; Roose, Marit; Venema, Sandra; Germeraad, Evelien; Engelsma, Marc; Heutink, Rene; Luca, Bordes
EPI_ISL_6101869	A/goose/Netherlands/21037720-001/2021	Netherlands	2021-10-28	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Harders, Frank; Pritz-Verschuren, Sylvia; Roose, Marit; Germeraad, Evelien; Engelsma, Marc; Heutink, Rene
EPI_ISL_7054770	A/European herring gull/Sweden/SVA211116SZ0432/FB004518/M-2021	Sweden	2021-11-08	Swedish Veterinary Agency (SVA)	Swedish Veterinary Agency (SVA)	
EPI_ISL_7683079	A/mute swan/Netherlands/21039627-002/2021	Netherlands	2021-11-26	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Harders, Frank; Pritz-Verschuren, Sylvia; Roose, Marit; Venema, Sandra; Germeraad, Evelien; Engelsma, Marc; Heutink, Rene
EPI_ISL_14760648	A/chicken/Italy/21VIR10382/2021	Italy	2021-11-29	Istituto Zooprofilattico Sperimentale delle Venezie, EU/OIE/Reference Laboratory and FAO Reference Centre for AI and ND	Istituto Zooprofilattico Sperimentale delle Venezie	Barbierato, G.; Zecchin, B.; Fusaro, A.; Schivo, A.; Salviato, A.; Palumbo, E.; Giussani, E.; Pastori, A.; Monne, I.; Terregino, C.
EPI_ISL_14760678	A/chicken/Italy/21VIR10637-2/2021	Italy	2021-12-04	Istituto Zooprofilattico Sperimentale delle Venezie, EU/OIE/Reference Laboratory and FAO Reference Centre for AI and ND	Istituto Zooprofilattico Sperimentale delle Venezie	Barbierato, G.; Zecchin, B.; Fusaro, A.; Schivo, A.; Salviato, A.; Palumbo, E.; Giussani, E.; Pastori, A.; Monne, I.; Terregino, C.

EPI_ISL_13370520	A/mute_swan/England/244574/2021	United Kingdom	2021-12-06	Animal and Plant Health Agency (APHA)	Animal and Plant Health Agency (APHA)	
EPI_ISL_18361460	A/grey heron/Croatia/132-b/2021	Croatia	2021-12-08	Croatian Veterinary Institute, Poultry Centre	Istituto Zooprofilattico Sperimentale delle Venezie	Savić, Vladimir; Pastori, Ambra; Zecchin, Bianca; Fusaro, Alice; Schivo, Alessia; Salviato, Annalisa; Palumbo, Elisa; Giussani, Edoardo; Monne, Isabella; Terregino, Calogero
EPI_ISL_14760774	A/chicken/Italy/21VIR11385-1/2021	Italy	2021-12-16	Istituto Zooprofilattico Sperimentale delle Venezie, EU/OIE/Reference Laboratory and FAO Reference Centre for AI and ND	Istituto Zooprofilattico Sperimentale delle Venezie	Barbierato, G.; Zecchin, B.; Fusaro, A.; Schivo, A.; Salviato, A.; Palumbo, E.; Giussani, E.; Pastori, A.; Monne, I.; Terregino, C.
EPI_ISL_14760849	A/turkey/Italy/21VIR11509/2021	Italy	2021-12-20	Istituto Zooprofilattico Sperimentale delle Venezie, EU/OIE/Reference Laboratory and FAO Reference Centre for AI and ND	Istituto Zooprofilattico Sperimentale delle Venezie	Barbierato, G.; Zecchin, B.; Fusaro, A.; Schivo, A.; Salviato, A.; Palumbo, E.; Giussani, E.; Pastori, A.; Monne, I.; Terregino, C.
EPI_ISL_13370629	A/Common_Buzzard/England/245285/2021	United Kingdom	2021-12-31	Animal and Plant Health Agency (APHA)	Animal and Plant Health Agency (APHA)	
EPI_ISL_11007535	A/swan/Slovenia/13_22VIR777-8/2022	Slovenia	2022-01-03	University of Ljubljana	Istituto Zooprofilattico Sperimentale delle Venezie	Slavec, B.; Ra?nik, J.; Krape?, U.; ?labravec, Z.; A?ko, J.; Cociancich, V.; Paller, T.; Vidrih, ?.; Rojs, O.Z.; Arseniev, S.; Groza, O.; Barbierato, G.; Zecchin, B.; Fusaro, A.; Schivo, A.; Salviato, A.; Palumbo, E.; Giussani, E.; Monne, I.; Terregino, C.
EPI_ISL_8694715	A/chicken/Croatia/7/2022	Croatia	2022-01-10	Croatian Veterinary Institute, Poultry Centre	Croatian Veterinary Institute	Savić, Vladimir; Pastori, Ambra; Zecchin, Bianca; Fusaro, Alice; Schivo, Alessia; Salviato, Annalisa; Palumbo, Elisa; Giussani, Edoardo; Monne, Isabella; Terregino, Calogero
EPI_ISL_11112340	A/Barnacle Goose/Netherlands/10/2022	Netherlands	2022-02-07	Erasmus Medical Center	Erasmus Medical Center	
EPI_ISL_11259294	A/chicken/Spain/452-1_22VIR2142-21/2022	Spain	2022-02-07	Laboratorio Central de Veterinaria	Istituto Zooprofilattico Sperimentale delle Venezie	Ruano, M.J.; Rocha, A.; Sanchez, A.; Aguero, M; Barbierato, G.; Zecchin, B.; Fusaro, A.; Schivo, A.; Salviato, A.; Palumbo, E.; Giussani, E.; Monne, I.; Terregino, C.
EPI_ISL_11560324	A/Graylag goose/Netherlands/2/20222	Netherlands	2022-03-06	Erasmus Medical Center	Erasmus Medical Center	
EPI_ISL_13990733	A/chicken/Spain/942-8_22VIR6312-34/2022	Spain	2022-03-08	Laboratorio Central de Veterinaria	Istituto Zooprofilattico Sperimentale delle Venezie	Ruano, M.J.; Rocha, A.; Sanchez, A.; Aguero, M; Barbierato, G.; Zecchin, B.; Fusaro, A.; Schivo, A.; Salviato, A.; Palumbo, E.; Giussani, E.; Monne, I.; Terregino, C.
EPI_ISL_13370916	A/chicken/England/033318/2022	United Kingdom	2022-03-27	Animal and Plant Health Agency (APHA)	Animal and Plant Health Agency (APHA)	
EPI_ISL_12215419	A/goose/Netherlands/22007407-002/2022	Netherlands	2022-04-15	Wageningen Bioveterinary Research	Wageningen Bioveterinary Research	Beerens, Nancy; Harders, Frank; Pritz-Verschuren, Sylvia; Roose, Marit; Venema, Sandra; Germeraad, Evelien; Engelsma, Marc; Heutink, Rene
EPI_ISL_14987487	A/common guillemot/Sweden/SVA220727SZ0354/FB00246 6/I-2022	Sweden	2022-07-27	Swedish Veterinary Agency (SVA)	Swedish Veterinary Agency (SVA)	
EPI_ISL_14497870	A/domestic_duck/England/105414/2022	United Kingdom	2022-08-07	Animal and Plant Health Agency (APHA)	Animal and Plant Health Agency (APHA)	
EPI_ISL_15038819	A/partridge/England/115171/2022	United Kingdom	2022-09-05	Animal and Plant Health Agency (APHA)	Animal and Plant Health Agency (APHA)	