

家禽流行性感冒病毒核酸序列

A/duck/Taiwan/a043/2015 (H5N2)

polymerase PB2 (PB2) gene

AGCAAAAGCAGGTCAATTATATTCAATATGGAGAGAATAAAAGAACTAAGAGACTTG
ATGTCGCATTCTCGCACTCGCGAGATACTGACAAAACCACTGTGGACCATATGGCC
ATAATTAAGAAATACACATCAGGAAGACAGGAGAAGAATCCTGCCCTTAGGATGAAA
TGGATGATGGCAATGAAATATCCGATTACAGCCGACAGAAGAATAATGGAAATGATC
CCCGAAAGAAATGAGCAAGGTCAAATTCTCTGGAGCAAAACAAATGATGCTGGATCA
GACAGAGTGATGGTATCACCTCTGGCTGTAACATGGTGGGAATAGAAATGGGCCGACG
ATAAGTACAGTCCACTATCCAAAGGTCTACAAAACCTTACTTTGAAAAAGTCGAAAGG
TTGAAACATGGAACCTTTGGTCCTGTTCACCTTCGAAATCAGGTTAAAAATACGCCGC
AGGGTTGACATAAACCCGGGCCATGCAGATCTCAGTGCCAAAGAAGCACAGGATGTC
ATCATGGAGGTCGTTTTCCCAAACGAAGTTGGAGCCAGGATATTGACATCAGAGTCA
CAATTAACAATAACAAAGGAGAAGAAGGAGGAGCTTCAGGACTGTAAATCGCTCCT
TTGATGGTGGCATAACATGTTGGAGAGAGAACTGGTTCGCAAAACCAGATTTCTACCA
GTAGCTGGCGGAACAAGCAGCGTGTATATCGAGGTATTGCATTTGACTCAGGGGACC
TGCTGGGAACAAATGTACACACCGGGAGGGGAGGTGAGAAATGATGATGTCGATCAG
AGTTTGATCATTGCTGCTAGAAATATTGTTAGGAGGGCAACAGTATCAGCAGACCCG
TTGGCTTCGCTCTTGGAGATGTGCCATAGTACACAAATTGGCGGGATAAGAATGGTG
GATATTCTTAGACAGAACCCAACAGAAGAGCAAGCTGTGGATATATGCAAAGCAGCT
ATGGGTTTGAGAATCAGTTCATCCTTCAGCTTTGGAGGTTTCACTTTCAAAAGAACA
AGTGGGTCATCTGTCAAAGAGAAGAAGAAGTGCTCACAGGCAACCTCCAAACATTG
AAAATAAGAGTACATGAAGGGTATGAAGAATTCACAATGGTTGGGCGAAGAGCCACA
GCCATTCTAAGGAAGGCAACCAGAAGGCTGATCCAATTAATAGTGAGTGGAAGAGAT
GAGCAGTCAATCGCTGAAGCGATTATAGTGGCAATGGTATTCTCACAAGAGGATTGC
ATGATAAAGGCAGTACGAGGTGATTTAACTTTGTTAACAGAGCAAATCAGCGGCTA
AATCCTATGCATCAACTTCTGAGGCATTTCCAAAAGGATGCAAAGGTGCTGTTTCAA
AACTGGGGAATTGAACCAATCGATAATGTCATGGGGATGATCGGAATGCTGCCTGAC
ATGACCCCCAGCACAGAGATGTCACTGAGAGGAGTAAGAGTCAGTAAATGGGAGTG
GATGAATATTCCAGTACTGAAAAAGTGCTCGTGAGCATTGATCGTTTCTTGAGAGTC
CGAGATCAGAGGGGAAACGTACTCTTGTCTCCTGAGGAAGTTAGTGAAACACAGGGA
ACAGAGAACTGACGATAACATATTCATCGTCTATGATGTGGGAAATCAATGGTCCG
GAATCAGTGCTAGTCAACACATACCAATGGATCATTAGAAATTGGGAAACTGTGAAG

ATTCAATGGTCCCAAGACCCTACAATGTTGTACAATAAGATGGAGTTTGAGCCATTC
CAATCCTTGGTGCCCAAGGCTGCCAGAGGTCAGTATAGTGGATTTGTTAGGACGTTA
TTCCAACAGATGCGTGATGTGCTGGGGACATTTGACACTGTCCAGATAATAAAGCTC
CTACCATTTGCAGCAGCCCCACCAGAACAGAGTAGGATGCAGTTCTCTTCTTTGACT
GTGAATGTAAGAGGTTTCAGGAATGAGAATCCTTGTGAGAGGCAACTCCCCTGTGTTT
AACTACAACAAGACAACCAAGAGACTCACAGTCCTTGGAAAGGATGCAGGTGCATTG
ACAGAAGATCCAGATGAGGGAACAGCAGGAGTGGAATCTGCGGTATTAAGAGGATTT
CTAATTCTGGGCAAAGAAGACAAAAGATATGGACCAGCATTGAGCATCAATGAATTG
AGCAATCTTGCGAAAGGGGAGAAGGCTAATGTGTTGATAGGGCAAGGAGACGTGGTG
TTGGTAATGAAACGGAAACGGGACTCTAGCATACTTACTGACAGCCAGACAGCGACC
AAAAGGATTCGGATGGCCATCAATTAGTGTGCAATTGTTTAAAAACGACCTTGTTTC
TACT

polymerase PB1 (PB1) gene

AGCGAAAGCAGGCAAACCATTTGAATGGATGTCAATCCGACTTTACTTTTCTTAAAA
GTGCCAGCGCAAAATGCTATAAGCACTACATTCCTTACACTGGAGATCCTCCATAT
AGCCATGGAACAGGGACAGGATACACCATGGACACAGTCAACAGAACACATCAATAC
TCAGAAAGGGGAAAGTGGACAACAAACACAGAAACCGGAGCGCCTCAACTCAACCCA
ATTGATGGACCATTACCTGAGGACAACGAGCCAAGTGGATACGCACAAACAGATTGC
GTATTGGAAGCAATGGCTTTTCTTGAAGAATCCCACCCAGGGATCTTTGAAAACCTCT
TGTCTTGAAACGATGGAAGTCGTTTCAGCAAACAAGAGTGGACAAACTAACCCAAGGT
CGCCAGACTTATGACTGGACACTAAATAGAAATCAACCAGCTGCAACTGCTTTGGCC
AATACTATAGAGGTCTTCAGATCGAACGGTATGACAGCCAATGAGTCAGGGAGATTA
ATAGATTTCTCAAGGATGTGATGGAATCAATGGATAAAGAAGAAATGGAAATAACA
ACACATTTCCAGAGAAAGAGAAGAGTGAGAGACAACATGACCAAGAAGATGGTCACA
CAAAGAACAATAGGGAAGAAGAAGCAGAGGCTGAACAAGAGGAGTTATTTAATAAGA
GCACTGACACTGAACACAATGACAAAAGATGCAGAACGGGGCAAATTGAAGAGGCGA
GCAATTGCAACACCTGGGATGCAGATTAGAGGATTCGTGTACTTTGTTGAAACACTA
GCGAGGAGCATTTGTGAGAACTCGAACAACTCTGGACTCCCTGTTGGAGGGAATGAA
AAGAAGGCTAAATTAGCAAATGTCTGAGAAAGATGATGACTAACTCACAAAGACACA
GAGCTCTCTTTACAAATCACTGGAGACAACACCAAATGGAATGAGAATCAGAATCCT
CGGATGTTTTTGGCAATGATAACATACATCACAAGAAACCAACCTGAATGGTTTTAGA
AATGTCTTGAGCATTGCCCTATAATGTTCTCAAACAAAATGGCGAGATTAGGAAAA
GGATACATGTTTGAAAGTAAGAGCATGAAGCTACGGACACAAATACCAGCAGAAATG
CTTGCAACATTGACTTGAAATACTTCAACGAGTCAACAAGAAAGAAAATCGAAAAG
ATAAGACCTTTGCTGATTGATGGCACAGCCTCACTGAGTCCTGGAATGATGATGGGC
ATGTTCAATATGCTGAGCACAGTATTAGGAGTCTCAATCCTGAATCTTGGACAAAAA
AGGTACACCAAAACCACATACTGGTGGGATGGACTCCAATCCTCTGATGACTTCGCT

CTTATAGTGAACGCACCGAATCACGAGGGAATACAAGCAGGGGTGAATAGGTTCTAT
AGGACTTGCAAACCTGGTTGGGATCAACATGAGCAAAAAGAAGTCTTACATAAATCGA
ACAGGAACATTTGAATTCACAAGCTTTTTCTACCGCTACGGATTTGTAGCCAACTTC
AGCATGGAGTTACCCAGCTTCGGAGTGTCTGGAATCAATGAATCAGCCGACATGAGC
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GCTCAGATGGCTCTTCAATTATTCATCAAAGACTATAGATACACATACCGATGCCAC
AGAGGCGATACACAAATTCAAACGAGGAGATCATTGAGCTGAAGAAGCTATGGGAG
CAGACCCGTTCAAAGCAGGGCTGTTGGTATCAGATGGAGGGCCAAACCTATACAAC
ATCCGGAATCTCCACATCCCAGAGGTCTGTTTGAAATGGGAACTGATGGATGAAGAT
TACCAGGGCAGGCTGTGTAATCCTCTGAACCCGTTTGTCAGTCATAAGGAAATTGAA
TCCGTAAACAACGCTGTGGTGATGCCAGCCCATGGTCCAGCCAAGAGCATGGAATAT
GATGCTGTTGCGACTACACATTCATGGATTCCCAAGAGAAACCGTTCCATTCTCAAT
ACCAGCCAAAGGGGAATCCTTGAGGATGAGCAGATGTACCAGAAGTGCTGCAGTCTA
TTCGAGAAATTCTTCCCCAGTAGTTCATACAGGAGGCCAGTTGGAATTTCCAGCATG
GTGGAGGCCATGATGTCTAGGGCCCGAATTGATGCACGCATTGATTTGAGTCTGGA
AGGATTAAGAAAGAAGAGTTTGCTGAGATCATGAAGATCTGTTCCACCATTGAAGAG
CTCAGACGGCAAAAATAGTGAATTTAGCTTGTCCTTCATGAAAAAATGCCTTGTTTC
TACT

polymerase PA (PA) gene

AGCAAAAGCAGGTACTGATCCGAAATGGAAGACTTTGTGCGACAATGCTTCAATCCA
ATGATTGTGCGAGCTTGCGGAAAAGGCAATGAAAGAATATGGGGAAGATCCGAAAATC
GAAACGAACAAATTTGCCGCAATATGCACACACTTGGAAGTCTGTTTCATGTATTCG
GATTTCCACTTCATTGATGAACGGGGCGAATCAATAATTGTAGAGTCTGGCGATCCG
AACGCATTATTGAAGCACCGATTTGAGATAATTGAGGGGAGAGACCGAACAATGGCC
TGGACAGTGGTGAATAGCATCTGCAACACCACAGGGGTGACAAGCCTAAATTCCTC
CCAGATTTGTATGACTACAAGGAGAACCGATTCATTGAAATTGGAGTGACACGAAGG
GAAGTTCACATATACTATCTAGAAAAAGCCAACAAGATAAAATCGGGGAAAACACAC
ATTCACATATTCTCATTCCTGAGAGGAGATGGCCACCAAAGCGGACTACACTCTT
GATGAAGAGAGCAGAGCAAGAATCAAAACCAGGCTGTTCACTATAAGGCAAGAAATG
GCCAGTAGGGGTCTATGGGATTCCTTTCGTGAGTCCGAGAGAGGCGAAGAGACAATT
GAAGAAAGATTTGAAATCACAGGAACCATGCGCAAGCTTGCCGACCAAAGTCTCCCA
CCGAATCTCCAGCTTTGAAAACCTTAGAGCCTATGTGGATGGATTGCAACCGAAC
GGCTGCATTGAGGGCAAGCTTTCTCAAATGTCAAAGAAGTGAACGCCAGAATTGAG
CCATTTCTGAAGACAACACCACGCCCTCTCAGATTACCTGATGGGCCTCCCTGCTCT
CAGCGGTGCAAGTTCTTGCTGATGGATGCCCTCAAATTAAGCATCGAAGACCCGAGC
CATGAGGGGGAAGGCATACCACTATATGATGCAATCAAATGCATGAAGACATTTTTTC
GGCTGGAAAGAGCCCAACATCGTAAAACCACATGAAAAAGGCATAAACCCCAATTAC

CTCCTGGCTTGGAAGCAGGTGCTAGCAGAACTCCAAGATATTGAAAATGAAGAGAAA
ATCCCCAAAACAAAGAACATGAAGAAAACAAGCCAGTTGAAATGGGCACTCGGTGAG
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CAGTATGACAGTGATGAACCAGAGTCTAGATCGCTAGCAAGCTGGATCCAGAGTGAA
TTCAACAAGGCATGCGAATTGACAGATTTCGAGTTGGATTGAACTTGATGAAATAGGG
GAAGACGTTGCCCCAATTGAGCACATCGCGAGTATGAGAAGAACTATTTTCACAGCG
GAAGTATCCCATTTGCAGGGCCACTGAATACATAATGAAGGGAGTGACATAAACACA
GCCCTGCTAAATGCATCCTGTGCAGCCATGGATGACTTCCAATTGATTCCAATGATA
AGCAAGTGCAGAACCACAAAGGAAGACGGAAGACAAATCTGTATGGATTCAATTATA
AAGGGAAGATCCCATTTGAGGAATGACACTGATGTGGTAACTTTGTGAGCATGGAA
TTATCTCTTACTGACCCGAGGCTGGAGCCGCACAAGTGGGAAAAGTACTGTGTTATC
GAGATAGGAGACATGCTCCTACGGACTGCAATAGGCCAAGTGTCAAGGCCCATGTTT
CTGTATGTGAGAACCAATGGGACTTCCAAGATTAAGATGAAATGGGGCATGGAAATG
AGGCGATGCCTTCTTCAATCCCTTCAACAAATTGAAAGCATGATTGAGGCCGAGTCT
TCTGTCAAAGAGAAGGACATGACCAAAGAATTCTTTGAGAACAAATCAGAAACATGG
CCAATTGGAGAATCCCCCAAAGGAGTGGAGGAAGGCTCCATCGGGAAGGTCTGCAGA
ACATTACTAGCAAAGTCTGTGTTCAACAGTCTATATGCATCTCCACAATTAGAGGGA
TTTTTCAGCTGAATCAAGAAAAATTGCTTCTCATTGTTTCAGGCACTTAGGGACAACCTT
GAACCTGGGACCTTCGATCTTGGGGGGCTATATGGAGCAATTGAGGAGTGCCTGATT
AATGATCCCTGGGTTTTGCTTAATGCGTCTTGGTTCAACTCCTTCCTCACACATGCA
CTGAGATAGTTGTGGCAATGCTACTATTTGCTATCCATACTGTCCAAAAAAGTACCT
TGTTTCTACT

hemagglutinin (HA) gene

AGCAAAAGCAGGGGTTCAATCTGTCAAAATGGAGAAAATAGTGCTTCTTCTTGCAGT
GATTAGCCTTGTTAAAAGTGATCAGATTTGCATTGGTTACCATGCAAACAACTCAAC
AAAGCAGGTTGACACGATAATGGAGAAAAACGTCACTGTTACACATGCCCAAGACAT
ACTGGAAGACACACAACGGGAAGCTCTGCGATCTTAATGGAGTGAAGCCCCTGAT
TCTAAAGGATTGTAGCGTAGCTGGGTGGCTCCTTGGAAATCCAATGTGCGACGAGTT
CATCAGGGTGCCGGAATGGTCTTACATCGTGGAGAGGGCTAACCCAGCCAACGACCT
CTGTTACCCAGGGACCCTCAATGACTATGAGGAACTGAAACACCTATTGAGCAGAAT
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ATCATTAGGGGTGAGCGCAGCATGTCCATACCAGGGAGCATCCTCATTTTTTCAGAAA
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TAATACCAATCGGGAAGATCTTTTGATACTGTGGGGGATTCATCATTTCCAACAATGC
AGCAGAGCAGACAAATCTCTATAAAAACCCAGACACTTATGTTTCCGTGGGGACATC
AACATTAAACCAGAGATTGGTGCCAAAAATAGCTACTAGATCCCAAGTAAACGGGCA
GAGTGAAGAATGGATTTCTTCTGGACAATTTTAAAACCGAATGATGCAATCCACTT



TGAGAGTAATGGAAATTTTCATTGCTCCAGAATATGCATACAAAATTGTCAAGAAAGG
GGACTCAACAATTATGAAAAGTGAAATGGAGTATGGCCACTGCAACACCAAATGTCA
AACTCCAATAGGGGCGATAAACTCTAGCATGCCATTCCACAATATACACCCTCTCAC
CATCGGGGAATGCCCCAAATACGTGAAGTCAAACAAATTAGTCCTTGCAGACTGGGCT
CAGAAATAGTCCTCTAAGAGAAAGAAGAAGAAAAAGAGGACTATTTGGAGCTATAGC
AGGGTTTATAGAGGGAGGATGGCAGGGAATGGTAGACGGTTGGTATGGGTATCATCA
TAGCAATGAGCAGGGGAGTGGGTACGCTGCAGACAAAGAATCCACCCAAAAGGCAAT
AGATGGAGTTACCAATAAGGTCAACTCAATCATTGACAAAATGAACACTCAATTTGA
GGCCGTTGGAAGGGAATTTAATAACTTAGAAAGGAGAATAGAGAATTTAAACAAGAA
AATGGAAGACGGATTCCTAGATGTCTGGACTTATAATGCTGAACTTTTAGTTCTCAT
GGAAAATGAGAGAACTCTAGATTTCCATGACTCAAATGTCAAGAACCTTTACGACAA
AGTCCGGCTACAGCTTAGGGATAATGCAAAAGAGCTGGGCAATGGTTGTTTCGAGTT
CTATCACAATGTGATAACGAATGTATGGAGAGCGTAAGAAATGGGACGTATGACTA
CCCTAAGTATTCAGAAGAAGCAATATTAAAAAGAGAAGAAATAAGCGGAGTGAAATT
AGAATCAATAGGAACTTACCAATACTGTCAATTTATTCAACAGTGGCGAGTTCCCT
AGCACTGGCAATCATAGTGGCTGGTCTATCTTTATGGATGTGCTCTAATGGGTCTGTT
ACAATGCAGAAATTTGCATCTAAATTTGTGAGCTCAGATTGTAATTAAAAACACCCTT
GTTTCTACT

nucleocapsid protein (NP) gene

AGCAAAAGCAGGGTAGATAATCACTCACTGAGTGACATCAACATCATGGCGTCTCAA
GGCACCAAACGATCTTATGAGCAGATGGAACTGGTGGAGAACGCCAGAATGCCACT
GAAATCAGAGCATCTGTTGGAAGGATGGTTAGTGGAATTGGGAGGTTTTACATACAG
ATGTGCACTGAACTCAAACCTCAGCGACTATGAAGGGAGGCTGATCCAGAACAGCATA
ACAATAGAGAGAATGGTTCTCTCGGCATTTGATGAAAGGAGGAACAAATACCTGGAA
GAGCATCCCAGTGCCGGAAGGATCCGAAGAAAACCTGGAGGTCCAATTTATCGAAGA
AGGGACGGGAAATGGGTGAGAGAGCTGATTCTGTATGACAAAGAGGAGATCAGGAGA
ATCTGGCGTCAAGCAAATAATGGAGAAGACGCAACTGCTGGTCTCACTCACCTGATG
ATCTGGCATTCCACTTAAATGATGCCACATACCAGAGAACCAGAGCTCTCGTGCGC
ACTGGGATGGACCCCGAATGTGCTCTCTGATGCAAGGATCAACTCTCCCGAGGAGA
TCTGGAGCTGCTGGCGCAGCAGTAAAGGGAGTCGGGACGATGGTGATGGAACTAATT
CGGATGATAAAACGAGGAATTAATGATCGGAATTTCTGGAGAGGCGAAAATGGACGG
AGAACAAGGATTGCATATGAGAGGATGTGCAACATCCTCAAAGGGAAATTCCAAACA
GCAGCACAAAGAGCAATGATGGATCAAGTGCGAGAAAGCAGAAATCCTGGAAATGCT
GAAATTGAAGATCTCATCTTCCTAGCACGGTCTGCGCTCATCCTGAGAGGATCAGTG
GCCACAAGTCCTGCCTTCCTGCTTGTGTGTACGGGCTTGCTGTGGCCAGTGGATAT
GACTTTGAGAGAGAAGGGTACTCTCTAGTTGGAATAGATCCTTTCCGTCTGCTTCAA
AACAGCCAGGTCTTCAGTCTCATTAGACCAAATGAGAACCCAGCACATAAGAGTCAA

TTGGTGTGGATGGCATGCCATTCTGCAGCATTTGAGGACCTGAGAGTCTCAAGTTTC
ATCAGAGGGACAAGAGTGGTCCCAAGAGGGCAACTATCCACCAGAGGAGTTCAAATT
GCTTCAAATGAGAACATGGAAACAATGGACTCCAGCACTCTTGAAGTGAAGAAGCAGA
TATTGGGCTATAAGGACCAGGAGTGGAGGAAACACCAACCAACAGAGAGCATCTGCA
GGACAGATCAGTGTACAGCCTACTTTCTCAGTACAGAGAAGTCTCCCCTTCGAAAGA
GCAACCATTATGGCGGCATTCACAGGAAATACTAAAGGCAGAACATCTGACATGAGG
ACTGAAATCATAAGAATGATGGAGAGTGCCAGACCAGAAGATGTGTCTTCCAGGGG
CGGGGAGTCTTCGAGCTCTCGGACGAAAAGGCAACGAACCCGATCGTGCCTTCCTTT
GACATGAGTAATGAAGGATCTTATTTCTTCGGAGACAATGCAGAGGAGTATGACAAT
TAAAGAAAAATACCCTTGTTTCTACT

neuraminidase (NA) gene

AGCAAAAGCAGGAGTGAAAATGAACCCAAACCAGAAGATAATAACAATTGGCTCTGT
CTCTCTAACCATTGCAACAGTATGTTTCCTCATGCAAATTGCCATCCTAGCAACGAC
TGTAACACTGCACTTCAAGCAGAATGAATGCAGCATTCCTTCGAACAATCAAGTAGT
GCCATGTGAGCCAATCATAATAGAAAGGAACATAACAGAGATAGTGTATTTGAATAA
CACCATCATAGAAAAAGAACTTTGCCCTAAATTGGCAGAATACAGGGACTGGTCGAA
ACCACAGTGTGAGATCACAGGGTTTGCTCCTTTCTCCAAGGACAACTCAATCCGACT
TTCTGCTGGTGGGGACATTTGGGTAACAAGAGAACCCTTATGTATCATGCAGTCCCAA
TAAATGTTATCAGTTTGCACTCGGTGAGGGAACACGCTAGACAACAAACATTCAAA
TGGCACAATACATGATAGAATTCCCCATCGAACCCTTTTAATGAACGAGTTGGGTGT
TCCATTCCATTTGGGGACCAAACAAGTGTGCATAGCATGGTCAAGCTCAAGCTGCCA
TGATGGAAGAGCATGGCTACACATTTGTGTTACTGGGGATGACAGGAATGCAACCGC
CAGTTTCATTTATAATGGGGTGCTTGTTGACAGTATTAGTTCATGGTCTCAAAACAT
TCTCAGAACTCAGGAGTCAGAGTGCCTCTGCATCAATGGAACCTGTACAGTAGTAAT
GACTGATGGAAGTGCATCAGGAAGGGCCGATACTAGAGTACTATTCATTAAAGAGGG
GAAAATTGTTTCATATCAGTCCATTATCAGGAAGTGCTCAGCATATAGAGGAGTGTTT
CTGTTATCCCCGCTATCCAGACGTCAGATGTGTCTGCAGAGACAATTGGAAAGGTTC
AAATAGGCCCGTTATAGATATAAGTATGGCAGATTATAGCATTGATTCTAGTTATGT
GTGCTCAGGGCTTGTTGGAGACACACCGAGAAACGATGATAGCTCTAGCAATAGTAA
CTGCAAGGATCCTAATAATGAGAGAGGGAGCCAGGAGTAAAAGGGTGGGCATTTGA
CTATGGAAATGATGTTTGGATGGGAAGAACAATCAGCAAGGATTCTCGCTCAGGTTA
TGAGACCTTCAGAGTCATTGAAGGTTGGACAACAGCTAATTCCAAATCTCAAGTAAA
TAGACAAGTCATAGTTGACAATAATAACTGGTCTGGTTATTCCGGCATTTTCTCTGT
TGAAGGTAAAAGCTGCATCAATAGGTGTTTTTATGTGGAGTTGATAAGAGGAAGGCC
ACAAGAGACTAGAGTGTGGTGGACCTCAAACAGTATTGTTGTGTTCTGTGGAACCTC
AGGTACTTATGGAACAGGCTCATGGCCTGATGGGGCGAATATCAATTTTATGCCTAT
ATAAGCTTTCGCAATTTTAGAAAAAACTCCTTGTTTCTACT

matrix protein 2 (M2) and matrix protein 1 (M1) genes

AGCAAAAGCAGGTAGATATTGAAAGATGAGTCTTCTAACCGAGGTCGAAACGTACGT
TCTCTCTATCATCCCGTCAGGCCCCCTCAAAGCCGAGATCGCGCAGAGACTTGAAGA
TGTCTTTGCAGGGAAAAACACCGATCTCGAGGCTCTCATGGAGTGGCTAAAGACAAG
ACCAATCCTGTCACCTCTGACTAAAGGGATTTTGGGATTTGTGTTTCACGCTCACCGT
GCCCAGTGAGCGAGGACTGCAGCGTAGACGCTTCGTCCAGAATGCCCTAAATGGAAA
TGGGGATCCAAATAATATGGATAAGGCAGTTAAGTTATATAAGAAGCTGAAAAGAGA
GATAACATTCCATGGGGCTAAGGAGGTGCGACTTAGCTACTCAACCGGTGCACTTGC
CAGCTGCATGGGTCTCATATACAACAGGATGGGAACGGTGACTACAGAAGTGGCTTT
TGGCCTAGTGTGTGCCACTTGTGAGCAGATTGCAGATTACAGCATCGGTCCACAG
ACAGATGGCAACCATCACCAACCCATTAATCAGACATGAGAACAGAATGGTGCTGGC
CAGCACTACAGCTAAGGCCATGGAGCAGATGGCAGGATCAAGCGAGCAGGCATCAGA
AGCCATGGAGGTTGCTAATCAGGCCAGGCAGATGGTACAGGCAATGAGGACAATTGG
GACTCATCCTAATTCTAGTGCTGGTCTGAGAGATAATCTTCTTGAAAATTTGCAGGC
CTACCAGAACCGAATGGGAGTGCAGATGCAGCGATTCAAGTGATCCTCTTGTGTTG
CCGCAAATATCATTGGGATCCTGCACTTGATATTGTGGATCCTTGATCGTCTTTTCT
TCAAATGCATTTATCGTCGCCTTAAATACGGTTTGAAAATAGGGCCTTCTACGGAAG
GGGTACCTGAGTCTATGAGGGAAGAGTACCGGCAGGAACAGCAGAGTGCTGTGGATG
TTGACGATGGTCATTTTGTCAACATAGAATTGGAGTAAAAAACTACCTTGTCTTCTAC
T

nuclear export protein (NEP) and nonstructural protein 1 (NS1) genes

AGCAAAAGCAGGGTGACAAAACATAATGGATTCCAACACTGTGTCAAGCTTTCAGG
TAGACTGCTTTCTTTGGCATGTCCGCAAACGATTTGCAGACCAAGAACTGGGTGATG
CCCCATTCTTGACCGGCTTCGCCGAGATCAGAAGTCCCTAAGAGGAAGAGGCAGCA
CTCTTGGTCTGGACATCGAGACAGCTACTCGTGCGGGAAAGCAGATAGTGGAGCGGA
TTCTGGAAGAAGAATCTGATGAGGCACTTAAAATGACTATTGCTTCAGTGTCTGGCTT
CACGCTACCTAACAGATATGACTCTTGAAGAGATGTCAAGGGACTGGTTCATGCTCA
TGCCCAAACAGAAAGTGGCAGGTTCCCTTTGCATCAGAATGGACCAGGCAACAATGG
ATAAAAACATCACATTAAAAGCAAACCTTCAGTGTGATTTTTGACCGGCTGGAGACCC
TAATACTACTTAGGGCTTTTACAGAAGAAGGAGCAATTGTGGGAGAAATCTCACCAT
TACCTTCTCTTCCAGGACATACTGATGAGGATGTCAAAAATGCAATTGGGGTCCTCA
TCGGAGGACTTGAATGGAATGATAACACAGTTCGAGTCTCTGAGACTCTACAGAGAT
TCGCTTGGAGAAGCAGTAATGAGGATGGGAGACCTCCACTCCCTCCAAAGCAGAAAC
GGAAAATGGCGAGAACAATTGAGTCAGAAGTTTGAAGAAATAAGATGGCTGATTGAA
GAAGTGCGACATAGGTTGAAGATTACAGAGAACAGTTTCGAACAAATAACGTTTATG



CAAGCCTTACAACCTATTGCTTGAAGTGGAGCAAGAGATGAGAACTTTCTCGTTTCAG
CTTATTTAATGATAAAAAACACCCTTGTTTCTACT

A/duck/Taiwan/a068/2015 (H5N8)

polymerase PB2 (PB2) gene

AGCAAAAGCAGGTCAATTATATTCAATATGGAGAGAATAAAAGAACTAAGAGATTTG
ATGTCGCAGTCTCGCACTCGCGAGATACTGACAAAGACCACTGTGGACCATATGGCC
ATAATCAAGAAATATACGTACAGGAAGACAGGAGAAGAATCCTGCACTTAGGATGAAA
TGGATGATGGCGATGAAATATCCGATTACAGCAGACAAAAGGATAATGGAAATGATT
CCCGAAAGAAACGAGCAAGGTCAGACTCTTTGGAGCAAAACAAATGATGCTGGATCA
GACAGAGTGATGGTGTACCTCTGGCTGTGACATGGTGGAAATAGAAATGGACCGACA
ACAAGTACAGTCCATTATCCAAAGGTCTATAAAACCTACTTTGAAAAAGTTGAAAGG
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GTAGCTGGCGGGACAAGCAGCGTGTATATCGAGGTGTTGCACTTGACCCAAGGGACC
TGCTGGGAACAAATGTACACGCCAGGAGGAGAAGTGAGAAATGATGACGTTGATCAG
AGTTTAATTATTGCTGCTAGGAATATCGTTAGGAGAGCAACAGTATCAGCAGATCCA
TTGGCTTCGCTCCTGGAGATGTGCCATAGTACACAAATTGGCGGGACAAGAATGGTA
GACATCCTTAGACAGAACCCAACAGAAGAGCAAGCCGTGGATATATGTAAAGCAGCA
ATGGGTCTAAGAATCAGTTCATCTTTCAGCTTTGGAGGTTTCACTTTCAAAAGGACA
AGTGGGTCATCTGTCAAAAGAGAAGAGGAAGTGCTTACCGGCAACCTCCAAACATTG
AAAATAAGGGTGCATGAAGGGTATGAGGAATTCACAATGGTTGGGCGAAGAGCAACA
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ATGATAAAAGCAGTACGGGGTGATTTGAATTTTCGTCAATAGAGCGAATCAGCGGCTC
AATCCTATGCATCAACTCTTGAGGCATTTCCAGAAGGATGCAAAGGTACTGTTCCAA
AACTGGGGAATTGAACCCATTGACAAATGTCATGGGGATGATAGGAATATTGCCTGAC
ATGACACCCAGCACAGAGATGTCACTAAGAGGAGTGAGAGTCAGTAAATGGGAGTG
GATGAATATTCCAGTACTGAGAGGGTGGTCGTGAGCATTGATCGTTTCTTGAGGGTC
CGAGACCAGAGAGGGAACGTGCTCCTGTCTCCTGAAGAGGTTAGTGAAACACAGGGA
ACAGAGAAGCTGACGATAACATATTCATCATCTATGATGTGGGAAATTAATGGCCCCG

GAATCAGTGTTAGTTAACACATACCAATGGATCATTAGAACTGGGAACTGTGAAG
ATTCAGTGGTCCCAAGATCCTACAATGCTATACAACAAGATGGAGTTTGAGCCCTTT
CAGTCCTTGGTGCCTAAGGCTGCCAGAGGCCAGTATAGTGGATTTGTGAGGACACTA
TTTCAGCAGATGCGTGATGTGCTGGGGACCTTTGACACAGTCCAGATAATAAAGCTA
CTGCCATTTGCAGCAGCCCCACCGGAGCAAAGTAGGATGCAGTTCTCTTCTCTAACT
GTGAACGTAAGAGGTTTCAGGAATGAGAATACTTGTGAGAGGCAATTCCCCTGTGTTT
AACTATAACAAGGCAACCAAGAGGCTTACAGTCCTTGGAAAGGATGCAGGTGCATTG
ACAGAAGACCCAGATGAGGGGACGGCAGGAGTGGAGTCTGCGGTATTAAGAGGGTTC
CTAATTCTGGGCAAAGAAGACAAAAGATATGGACCAGCATTGAGCATCAATGAATTG
AGCAATCTTGCGAAGGGGGAGAAGGCTAATGTGTTGATAGGGCAAGGAGACGTGGTG
TTGGTGATGAAACGGAAACGGGACTCTAGCATACTTACTGACAGCCAGACAGCGACC
AAAAGAATTCGGATGGCCATCAATTAGTGTGCAATAGTTTAAAAACGACCTTGTTTC
TACT

polymerase PB1 (PB1) gene

AGCAAAAGCAGGCAAACCATTTGAATGGATGTCAATCCGACTTTACTTTTCTTAAAA
GTGCCAGCGCAAAATGCTATAAGTACTACATTCCCTTACACTGGAGATCCTCCATAC
AGCCATGGAACAGGAACAGGATACACCATGGACACAGTCAACAGAACACATCAATAC
TCAGAGAAAGGAAAGTGGACAACAAACACAGAGACCGGGGCACCCCAACTCAACCCA
ATTGATGGACCATTACCAGAGGACAACGAGCCAAGCGGATATGCACAAACGGATTGC
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CAAAGAACAATAGGAAAGAAGAAGCAAAGGCTGAACAAAAGGAGCTACTTGATAAGA
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GCAATTGCAACACCCGGGATGCAGATTAGAGGATTCGTGTACTTTGTGCGAAACACTA
GCGAGGAGCATCTGTGAGAACTTGAGCAATCTGGACTCCCCGTTGGAGGGAATGAG
AAGAAGGCTAAATTGGCAAATGTTGTGAGAAAAATGATGACTAACTCACAAGATACA
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CGGATGTTTTTGGCAATGATAACATACATCACAAGAAACCAACCAGAATGGTTTAGA
AATGTCTTGAGCATTGCCCCATAATGTTCTCAAATAAAATGGCGAGATTGGGGAAA
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CTTGCAAACATTGATTTGAAAATACTTCAACGAATCAACGAGAAAGAAAATCGAGAAA
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ATGTTCAATATGCTGAGCACAGTATTAGGGGTCTCAATCCTGAATCTTGGACAAAAG



AGGTACACTAAAACCACATACTGGTGGGATGGACTCCAATCCTCTGATGATTTTCGCT
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CAGACCCGTTCAAAGGCAGGGCTGTTGGTATCAGATGGAGGACCGAATCTATACAAC
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ACCAGCCAAAGGGGAATTCTTGAGGATGAGCAGATGTACCAGAAGTGCTGTAGTCTA
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AGGATTAAGAAAGAAGAGTTTGCTGAGATCATGAAGATCTGTTCCACCATTGAAGAG
CTCAGACGGCAAAAATAGTGAATTTAGCTTGTCTTCATGAAAAAATGCCTTGTTTC
TACT

polymerase PA (PA) gene

AGCAAAAGCAGGTACTGATTCGAAATGGAAGACTTTGTGCGGCAATGCTTCAATCCA
ATGATCGTCGAGCTTGCGGAAAAGACAATGAAAGAATATGGGGAAAATCCAAAATC
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CAGCGGTCGAAATTCTTACTGATGGATTCCCTTAAATTGAGCATCGAAGACCCAAGC
CATGAGGGAGAAGGTATACCGCTATATGATGCAATCAAATGCATGAAGACGTTTTTT



GGTTGGAAAGAGCCCAACATTGTAAAACCACATGTAAAAGGCATAAATCCCAACTAT
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GAACCTGGGACCTTCGATCTTGGGGGGCTATATGAAGCAATTGAGGAGTGCCTGATT
AATGATCCCTGGGTTTTGCTTAATGCATCTTGGTTCAACTCCTTCCTTACACATGCA
CTGAAATAGTTGTGGCAATGCTACTATTTGCTATCCATACTGTCCAAAAAAGTACCT
TGTTTCTACT

hemagglutinin (HA) gene

AGCAAAAGCAGGGGTTCAATCTGTCAAAATGGAGAAAATAGTGCTTCTTCTTGCAGT
GATTAGCCTTGTTAAAAGTGATCAGATTTGCATTGGTTACCATGCAAACAACCTCAAC
AATGCAGGTTGACACGATAATGGAGAAAAACGTCACTGTTACACATGCCCAAGACAT
ACTGGAAGAGACACACAACGGGAAGCTCTGCGATCTTAATGGAGTGAAGCCCCTGAT
TCTAAAGGATTGTAGCGTAGCTGGGTGGCTCCTTGGAAATCCAATGTGCGACGAGTT
CATCAGGGTGCCGGAATGGTCTTACATCGTGGAGAGGGCTAACCCAGCCAACGACCT
CTGTTACCCAGGGACCCTCAATGACTATGAGGAACTGAAACACCTATTGAGCAGAAT
AAATCATTTTTGAGAAAACCTCTGATCATCCCCAGGAGTTCTTGGCCCAATCATGAAAC
ATCATTAGGGGTGAGCGCAGCATGTCCATACCAGGGAGCATCCTCATTTTTTCAGAAA
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AGCAGAGCAGACAAATCTCTATAAAAACCCAGACACTTATGTTTCCGTGGGGACATC
AACATTAAACCAGAGATTGGTGCCAAAAATAGCTACTAGATCCCAAGTAAACGGGCA

AAGTGAAGAATGGATTTCTTCTGGACAATTTTAAAACCGAATGATGCAATCCACTT
TGAGAGTAATGGAAATTTTCATTGCTCCAGAATATGCATACAAAATTGTCAAGAAAGG
GGAATCAACAATTATGAAAAGTGAAATGGAGTATGGCCACTGCAACACCAAATGTCA
AACTCCAATAGGGGCGATAAACTCTAGCATGCCATTCCACAATATACACCCTCTCAC
CATCGGGGAATGCCCCAAATACGTGAAGTCAAACAAATTGGTCCTTGCGACTGGGCT
CAGAAATAGTCCTCTAAGAGAAAGAAGAAGAAAAAGAGGACTATTTGGAGCTATAGC
AGGGTTTATAGAGGGAGGATGGCAGGGAATGGTAGACGGTTGGTATGGGTATCATCA
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AGATGGAGTTACCAATAAGGTCAACTCAATCATTGACAAAATGAACACTCAATTTGA
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AGTCCGGCTACAGCTTAGGGATAATGCAAAAGAGCTGGGTAAATGGTTGTTTCGAGTT
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CCCTAAGTATTCAGAAGAAGCAATATTTAAAAGAGAAGAAATAAGCGGAGTGAAATT
AGAATCAATAGGAACTTACCAATATTTGTCAATTTATTCAACAGTGGCGAGTTCCCT
AGCACTGGCAATCATAGTGGCTGGTCTATCTTTATGGATGTGCTCTAATGGGTGCTT
ACAATGCAGAAATTTGCATCTAAATTTGTGAGCTCAGATTGTAATTTAAAACACCCTT
GTTTCTACT

nucleocapsid protein (NP) gene

AGCAAAAGCAGGGTATATAATCACTCACTGAGTGACATCAACATCATGGCGTCTCAA
GGCACCAAACGATCTTATGAACAGATGGAACTGGTGGAGAACGCCAGAATGCCACT
GAAATCAGAGCATCTGTTGGAAGGATGGTTGGTGGAAATTGGGAGGTTTTACATACAG
ATGTGCACTGAACTCAAACCTCAGCGACTATGAAGGGAGGCTGATCCAGAACAGCATA
ACAATAGAGAGAATGGTTCTTTCTGCATTTGATGAAAGGAGGAACAAATACCTGGAA
GAGCATCCCAGTGCTGGAAAGGATCCGAAGAAAACCTGGAGGTCCAATTTATCGAAGA
AGGGACGGGAAATGGATGAGAGAGCTGATTCTGTATGACAAAGAGGAGATCAGGAGA
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TCTGGAGCTGCTGGAGCAGCAGTAAAGGGAGTCGGGACGATGGTGATGGAACATAATT
CGAATGATAAAAACGAGGAATTAATGATCGGAATTTCTGGAGAGGCGAAAATGGACGG
AGAACAAGGATTGCATATGAGAGGATGTGCAACATCCTCAAAGGGAAATTCCAAACA
GCAGCACAAAGAGCAATGATGGATCAAGTGCAGAGAAAGCAGAAATCCTGGGAATGCT
GAAATTGAAGATCTCATCTTCCTGGCACGGTCTGCGCTCATCCTGAGAGGATCAGTG
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GCTTCAAATGAGAACATGGAAACAATGGACTCCAGCACTCTTGAACTAAGGAGCAGA
TATTGGGCTATAAGGACCAGGAGTGGAGGAAACACCAACCAACAGAGAGCATCTGCA
GGACAGATCAGTATACAGCCTACTTTCTCAGTACAGAGAAGTCTTCCCTTCGAAAGG
GCAACCATTATGGCGGCATTACAGGAAATACTGAAGGCAGAACATCTGACATGAGG
ACTGAAATCATAAGAATGATGGAAAGTGCCAGACCAGAAGATGTGTCCTTTCAGGGG
CGGGGAGTCTTCGAGCTCTCGGACGAAAAGGCAACGAACCCGATCGTGCCTTCCCTT
GACATGAGTAATGAAGGATCTTATTTCTTCGGAGACAATGCAGAGGAGTATGACAAT
TAAAGAAAAATACCCTTGTTTCTACT

neuraminidase (NA) gene

AGCAAAAGCAGGAGTTTAAATGAATCCAAATCAGAAAATAGTAACCATTGGCTCCA
TTTCATTAGGGTTGGTTGTATTCAATGTTCTACTGCATGCCGTGAGCATCATATTAA
CAGTGTTAGCCCTGGGGAAGAGTGAAAACAATGGAATCTGCAATGGAAGTGTAGTGA
GGGAACACAATGAAACAGTTAGAATAGAGAAAGTGACTCAATGGTACAATACTAGCG
TAGTCGAATATGTACCGCATTGGAATGAGGGAACTTATATAAACAACACCGAACCAA
TATGTGATGTCAAGGGCTTTGCACCTTTTTTCCAAGGACAACGGGGTGAGAGTTGGCT
CCAGGGGGCATATTTTTGTCTATAAGAGAGCCTTTTCGTCTCTTGTTTACCAGTAGGGT
GCAGGACTTTCTTCTCACTCAGGGATCTCTACTCAATGACAAACACTCAAATGGAA
CAGTGAAGGATAGAAGCCCATTCAGAACTCTCATGAGTGTCGAAGTGGGCCAATCAC
CCAATGTATATCAAGCCAGGTTTGAAGCTGTGGCATGGTCAGCAACAGCCTGTCATG
ATGGTAAGAAGTGGATGGCAATTGGTGTAACAGGGCCAGATTCTAAAGCAGTAGCAG
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CTGACGGTCTTGCCAAATAGACAGGCGCAGTATAGAATATACAAAGCAAACCAAGGCA
AAATAATTGGCCGAAAAGATGTTAGCTTTAGTGGAGGACATATTGAGGAATGTTCTT
GTTATCCAAATGATGGTAAAGTGAATGCGTGTGTAGAGACAACCTGGACGGGAACTA
ACAGACCTGTGCTAATTATTTGCCTGATCTCTCTTACAGAGTTGGGTATTTATGTG
CAGGGTTGCCAGTGACACTCCAAGAGGGGAGGATACTCAATTTGTCGGTTCATGCA
CTAGTCCCATGGGAAATCAGGGGTATGGCGTAAAAGGGTTCGGGTTTCGACAGGGAA
CTGATGTGTGGGTGGGGCGGACAATTAGTCGAACCTCCAGATCAGGATTTGAAATAA
TAAGGATAAAGAATGGTTGGACGCAAACAAGCAAAGAACAGATTAGAAGACAGGTGG
TTGTTGATAACTCGAATTGGTCGGGATACAGTGGGTCTTTCACCTTACCAGCAGAAT
TGACTGGGAGGGAATGTTTGGTTCCTGTTTTTGGGTCGAAATGATCAGAGGTAGGC
CAGAAGAGAGAACAATCTGGACCTCTAGTAGCTCCATTGTAATGTGTGGAGTTGATT
ATGAAATTGCCGACTGGTCATGGCACGATGGAGCTATTCTTCCCTTTGACATCGATA

AGATGTAATTTACGAAAAAACTCCTTGTTTCTACT

matrix protein 2 (M2) and matrix protein 1 (M1) genes

AGCAAAAGCAGGTAGATATTGAAAGATGAGTCTTCTAACCGAGGTCGAAACGTACGT
TCTCTCTATCATCCCGTCAGGCCCCCTCAAAGCCGAGATCGCGCAGAGACTTGAAGA
TGTCTTTGCAGGGAAAAACACCGATCTCGAGGCTCTCATGGAGTGGCTAAAGACAAG
ACCAATCCTGTCACCTCTGACTAAAGGGATTTTGGGATTTGTGTTACGCTCACCGT
GCCCAGTGAGCGAGGACTGCAGCGTAGACGCTTCGTCCAGAATGCCCTAAATGGAAA
TGGGGATCCAAATAATATGGATAAGGCAGTTAAGCTATATAAGAAGCTGAAAAGAGA
GATAACATTCCATGGGGCTAAGGAGGTCGCACTTAGCTACTCAACCGGTGCACTTGC
CAGCTGCATGGGTCTCATATACAACAGGATGGGAACGGTGACTACAGAAGTGGCTTT
TGGCCTAGTGTGTGCCACTTGTGAGCAGATTGCAGATTACAGCATCGGTCCACAG
ACAGATGGCAACCATCACCAACCCATTAATCAGACATGAGAACAGAATGGTGCTGGC
CAGCACTACAGCTAAGGCCATGGAGCAGATGGCAGGATCAAGCGAGCAGGCATCAGA
AGCCATGGAGGTTGCTAATCAGGCCAGGCAGATGGTACAGGCAATGAGGACAATTGG
GACTCATCCTAATTCTAGTGCTGGTCTGAGAGATAATCTTCTTGAAAATTTGCAGGC
CTACCAGAACCGAATGGGAGTGCAGATGCAGCGATTCAAGTGATCCTCTTGTTGTTG
CCGCAAATATCATTGGGATCCTGCACTTGATATTGTGGATCCTTGATCGTCTTTTCT
TCAAATGCATTTATCGTCGCCTTAAATACGGTTTGAAAATAGGGCCTTCTACGGAAG
GGGTACCTGAGTCTATGAGGGAAGAGTACCGGCAGGAACAGCAGAGTGCTGTGGATG
TTGACGATGGTCATTTTGTCAACATAGAATTGGAGTAAAAAACTACCTTGTTTCTAC
T

nuclear export protein (NEP) and nonstructural protein 1 (NS1) genes

AGCAAAAGCAGGGTGACAAAAACATAATGGATTCCAACACTGTGTCAAGCTTTCAGG
TAGACTGCTTTCTTTGGCATGTCCGCAAACGATTTGCAGACCAAGAACTGGGTGATG
CCCCATTCTTGACCGGCTTCGCCGAGATCAGAAGTCTCTAAGAGGAAGAGGCAGCA
CTCTTGGTCTGGACATCGAGACAGCTACTCGTGCGGGAAAGCAAATAGTGAGCGGA
TTCTGGAAGAGGAATCTGATGAGGCACTTAAAATGACTATTGCTTCAGTGCCGGCTT
CACGCTACCTAACTGACATGACTCTTGAAGAGATGTCAAGGGACTGGTTCATGCTCA
TGCCCCAACAGAAAGTGGCAGGTTCCCTTTGCATCAGAATGGACCAAGCAATAATGG
ATAAAAACATCGTATTGAAAGCAAACCTCAGTGTGATTTTTGATCGGCTGGAGACCC
TAATACTACTTAGGGCTTTCACAGAAGAAGGAGCAATTGTGGGAGAAATCTCACCGT
TACCTTCTCTTCCAGGACATACTGATGAGGATGTCAAAAATGCAATTGGGGTCTCA
TCGGAGGGCTTGAATGGAATGATAACACAGTTCGAGTCTCTGAAACTCTACAGAGAT
TCGCTTGAGAAAGCAGTAATGAGGATGGGAGACCTCCACTCCCTCCAAAACAGAAAC
GGAAAATGGCGAGAACAATTGAGTCAGAAGTTTGAAGAAATAAGATGGCTGATTGAA

GAAGTGCACATAGATTGAAGGTTACAGAGAACAGCTTCGAACAAATAACGTTTATG
CAAGCCTTACAACCTATTGCTTGAAGTGGAGCAAGAGATAAGAACTTTCTCGTTTCAG
CTTATTTAATGATAAAAAACACCCTTGTTTCTACT

A/duck/Taiwan/a180/2015 (H5N3)

polymerase PB2 (PB2) gene

AGCGAAAGCAGGTCAATTATATTCAATATGGAGAGAATAAAAGAACTAAGAGATTTG
ATGTCGCAGTCTCGCACTCGCGAGATACTGACAAAGACCACTGTGGACCATATGGCC
ATAATCAAGAAATATACGTCAGGAAGACAGGAGAAGAATCCTGCACTTAGGATGAAA
TGGATGATGGCGATGAAATATCCGATTACAGCAGACAAAAGGATAATGGAAATGATT
CCCGAAAGAAACGAGCAAGGTCAGACTCTTTGGAGCAAAACAAATGATGCTGGATCA
GACAGAGTGATGGTGTACCTCTGGCTGTGACATGGTGGAATAGAAATGGACCGACA
ACAAGTACAGTCCATTATCCAAAGGTCTATAAAACCTACTTTGAAAAAGTTGAAAGG
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AGGGTTGACATAAACCAGGCCATGCAGATCTCAGTGCTAAAGAAGCACAGACGTC
ATCATGGAGGTCGTTTTCCCAAACGAAGTCGGAGCCAGGATATTGACATCAGAGTCA
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TGCTGGGAACAAATGTACACGCCAGGAGGAGAGGTGAGAAATGATGACGTTGATCAG
AGTTTAATTATTGCTGCTAGGAATATCGTTAGGAGAGCAACAGTGTCAGCAGATCCA
TTGGCTTCGCTCCTGGAGATGTGCCATAGTACACAAATTGGCGGGACAAGAATGGTA
GACATCCTTAGACAAAACCCAACAGAAGAGCAAGCCGTGGATATATGTAAAGCAGCA
ATGGGTCTAAGAATCAGTTTCATCCTTCAGCTTTGGAGGTTCCACTTTCAAAAGGACA
AGTGGGTCATCTGTCAAAGAGAGAAGAGGAAGTGCTTACCGGCAACCTCCAAACATTG
AAAATAAGGGTGCATGAAGGGTATGAGGAATTCACAATGGTTGGGCGAAGAGCAACA
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ATGACACCCAGCACAGAGATGTCACTAAGAGGAGTGAGAGTCAGTAAATGGGAGTG
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CGAGACCAGAGAGGGAACGTGCTCCTGTCTCCTGAAGAGGTTAGTGAAACACAGGGA



ACAGAGAAGCTGACGATAACATATTCATCATCTATGATGTGGGAAATTAATGGCCCG
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ACAGAAGACCCAGATGAGGGGACGGCAGGAGTGGAGTCTGCGGTATTAAGAGGGTTC
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AGCAATCTTGCGAAGGGGGAGAAGGCTAATGTGTTGATAGGGCAAGGAGACGTGGTG
TTGGTGATGAAACGGAAACGGGACTCTAGCATACTTACTGACAGCCAGACAGCGACC
AAAAGAATTCGGATGGCCATCAATTAGTGTGCAATAGTTTAAAAACGACCTTGTTTC
TACT

polymerase PB1 (PB1) gene

AGCAAAAGCAGGCAAACCATTTGAATGGATGTCAATCCGACTTTACTTTTCTTAAAA
GTGCCAGCGCAAAATGCTATAAGTACTACATTCCCTTACACTGGAGATCCTCCATAC
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TCAGAGAAAGGAAAGTGGACAACAAACACAGAGACCGGGGCACCCCAACTCAACCCA
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GTGTTGGAAGCAATGGCTTTTCCTTGAAGAATCCCAACCCAGGGATCTTTGAAAACCTCT
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ACACATTTTCAGAGAAAGAGAAGAGTAAGGGACAATATGACCAAGAAGATGGTCACA
CAAAGAACAATAGGAAAGAAGAAGCAAAGGCTGAACAAAAGGAGCTACTTGATAAGA
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GCAATTGCAACACCCGGGATGCAGATTAGAGGATTCGTGTACTTTGTGAAACACTA
GCGAGGAGCATCTGTGAGAACTTGAGCAATCTGGACTCCCCGTTGGAGGGAATGAG
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CTCAGACGGCAAAAATAGTGAATTTAGCTTGTCTTCATGAAAAAATGCCTTGTTTC
TACT

polymerase PA (PA) gene

AGCAAAAGCAGGTACTGATCCGAAATGGAAGACTTTGTGCGGCAATGCTTCAATCCA
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GCCAATAGGGGTCTGTGGGATTCCTTTCGTCAATCTGAGAGAGGCGAAGAGACAATT
GAAGAAAGGTTTGAAATCACAGGAACCATGCGCAGGCTTGCCGACCAAAGCCTCCCA
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GGCTGCCTTGAGGGCAAGCTTTCTCAAATGTCAAAAAGAAGTGAACGCCAGAATTGAG
CCATTCATGAAGACAACACCACGCCCTCTCAGATTACCTGATGGTCCTCCTTGCTCT
CAGCGGTCGAAATTCTTACTGATGGATTCCCTTAAATTGAGCATCGAAGACCCAAGC

CATGAGGGAGAAGGTATACCGCTATATGATGCAATCAAATGCATGAAGACGTTTTTT
GGTTGGAAAGAGCCCAACATTGTAAAACCATATGTAAAAGGCATAAATCCCAACTAT
CTCTTGGCTTGAAGCAGGTGCTGGCAGAACTCCAAGACATTGAGAATGAAGAGACA
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GCCCTGTTGAATTCATCCTGTGCAGCCATGGATGACTTCCAATTGATTCCAATGATA
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ACATTATTAGCAAAATCTGTATTCAACAGCCTATATGCATCTCCACAACCTTGAGGGG
TTTTTCAGCTGAGTCGAGAAAGTTACTTCTCATTGTTTCAGGCATTTAGGGACAACCTG
GAACCTGGGACCTTCGATCTTGGGGGGCTATATGAAGCAATTGAGGAGTGCCTGATT
AATGATCCCTGGGTTTTGCTTAATGCATCTTGGTTCAACTCCTTCCTTACACATGCA
CTGAAATAGTTGTGGCAATGCTACTATTTGCTATCCATACTGTCCAAAAAAGTACCT
TGTTTCTACT

hemagglutinin (HA) gene

AGCAAAAGCAGGGGTCAATCTGTCAAAATGGAGAAAATAGTGCTTCTTCTTGCAGT
GATTAGCCTTGTTAAAAGTGATCAGATTTGCATTGGTTACCATGCAAACAACCTCAAC
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ACTGGAAGAGACACACAACGGGAAGCTCTGCGATCTTAATGGAGTGAAGCCCCTGAT
TCTAAAGGATTGTAGCGTAGCTGGGTGGCTCCTTGGAATCCAATGTGCGACGAGTT
CATCAGGGTGCCGGAATGGTCTTACATCGTGGAGAGGGCTAACCCAGCCAACGACCT
CTGTTACCCAGGGACCCTCAATGACTATGAGGAACTGAAACACCTATTGAGCAGAAT
AAATCATTTTGAGAAAACCTCTGATCATCCCCAGGAGTTCTTGGCCCAATCATGAAAC
ATCATTAGGGGTGAGCGCAGCATGTCCATACCAGGGAGCATCCTCATTTTTTCAGAAA
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TGAGAGTAATGGAAATTTTCATTGCTCCAGAATATGCATACAAAATTGTCAAGAAAGG
GGAATCAACAATTATGAAAAGTGAAATGGAGTATGGCCACTGCAACACCAAATGTCA
AACTCCAATAGGGGCGATAAACTCTAGCATGCCATTCCACAATATACACCCTCTCAC
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CAGAAATAGTCCTCTAAGAGAAAGAAGAAGAAAAAGAGGACTATTTGGAGCTATAGC
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TAGCAATGAGCAGGGGAGTGGGTACGCTGCAGACAAAGAATCCACCCAAAAGGCAAT
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CCCTAAGTATTCAGAAGAAGCAATATTAAGAGAGAAGAAATAAGCGGAGTGAAATT
AGAATCAATAGGAACTTACCAATACTGTCAATTTATTCAACAGTGGCGAGTTCCCT
AGCACTGGCAATCATAGTGGCTGGTCTATCTTTATGGATGTGCTCTAATGGGTCGTT
ACAATGCAGAAATTTGCATCTAAATTTGTGAGCTCAGATTGTAATTAAGAACACCCTT
GTTTCTACT

nucleocapsid protein (NP) gene

AGCAAAAGCAGGGTATATAATCACTCACTGAGTGACATCAACATCATGGCGTCTCAA
GGCACCAAACGATCTTATGAACAGATGGAACTGGTGGAGAACGCCAGAATGCCACT
GAAATCAGAGCATCTGTTGGAAGGATGGTTGGTGGAAATTGGGAGGTTTTACATACAG
ATGTGCACTGAACTCAAACCTCAGCGACTATGAAGGGAGGCTGATCCAGAACAGCATA
ACAATAGAGAGAATGGTTCTTTCTGCATTTGATGAAAGGAGGAACAAATACCTGGAA
GAGCATCCCAGTGCTGGAAAGGATCCGAAGAAAACCTGGAGGTCCAATTTATCGAAGA
AGGGACGGGAAATGGATGAGAGAGCTGATTCTGTATGACAAAGAGGAGATCAGGAGA
ATCTGGCGTCAAGCGAATAATGGAGAAGACGCAACTGCTGGTCTCACTCACCTGATG
ATCTGGCATTCCAACCTAAATGATGCCACATACCAGAGAACCAGAGCTCTTGTGCGC
ACTGGGATGGACCCAGAAATGTGCTCTCTGATGCAAGGGTCAACTCTCCCGAGGAGA
TCTGGAGCTGCTGGAGCAGCAGTAAAGGGAGTCGGGACGATGGTGTGGAATAATT
CGAATGATAAAACGAGGAATTAATGATCGGAATTTCTGGAGAGGCGAAAATGGACGA
AGAACAAGGATTGCATATGAGAGGATGTGCAACATACTCAAAGGGAAATTCCAAACA
GCAGCACAAAGAGCAATGATGGATCAAGTGCAGAGAAAGCAGAAATCCTGGGAATGCT
GAAATTGAAGATCTCATCTTCCTGGCACGGTCTGCGCTCATCCTGAGAGGATCAGTG
GCCATAAGTCCTGCCTTCCTGCTTGTGTGTACGGCCTTGCTGTGGCCAGTGGGTAT



GATTTTGAGAGAGAAGGGTACTCTCTAGTTGGAATAGATCCTTTCCGTCTGCTTCAA
AACAGCCAGGTCTTCAGTCTCATTAGACCAAATGAGAACCCAGCACACAAGAGTCAA
TTGGTGTGGATGGCATGCCATTCTGCAGCATTTGAGGACCTGAGAGTCTCAAGTTTC
ATCAGAGGGACAAGAGTGGTCCCAAGAGGGCAACTATCCACTAGAGGAGTTCAAATT
GCTTCAAATGAGAACATGGAAACAATGGACTCCAACACTCTTGAACATAAGGAGCAGA
TATTGGGCTATAAGGACCAGGAGTGGAGGAAACACCAACCAACAGAGAGCATCTGCA
GGACAGATCAGTGTACAGCCTACTTTCTCAGTACAGAGAAGTCTTCCCTTCGAAAGG
GCAACCATTATGGCGGCATTCACAGGAAATACTGAAGGCAGAACATCTGACATGAGG
ACTGAAATCATAAGAATGATGGAAAGTGCCAGACCAGAAGATGTGTCCTTCCAGGGG
CGGGGAGTCTTCGAGCTCTCGGACGAAAAGGCAACGAACCCGATCGTGCCTTCCTTT
GACATGAGTAATGAAGGATCTTATTTCTTCGGAGACAATGCAGAGGAGTATGACAAT
TAAAGAAAAATACCCTTGTTTCTACT

neuraminidase (NA) gene

AGCAAAAGCAGGAGTTTAAATGAATCCAAATCAGAAGATAATAACAATTGGTGTAG
TGAATACTACTCTATCAACAATAGCCCTTCTTATTGGAATTGGGAATCTGATCTTCA
AACTGTCATACATGAGAAAAATAGGGGACCACCAAATGTGGTATATCCAACAATAA
CAGCCCCAGTGGTACCAAACTGCAGTGACACCACAATCACATACAACAACACTGTGG
TACATAACATAACAACGACAATAATAACCGAAGCGGAAAAGCATTTCAAATCCTCAC
TGCCGCTATGCCCCCTCCGAGGTTTCTTCCCCTTTCACAAGGACAATGCAATACGAT
TGGGTGAGAACAAAGACGTAATAGTCACAAGGGAGCCCTATGTCAGTTGTGACAATG
ATAATTGCTGGTCTTTTGCCCTCGCTCAAGGGGCTCTACTGGGGACTAAACACAGCA
ATGGAACCATCAAGGACAGGACGCCATATAGATCGCTGATCCGGTTCCCAATAGGAA
CAGCTCCAGTACTGGGCAATTACAAAGAGATATGTGTTGCCTGGTCAAGTAGCAGTT
GCTTCGATGGAAAGGAATGGATGCATGTTTGCATGACTGGGAACGACAATGATGCGA
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AAGGTAAGGTAATGAAGTATGAAAACATTCTTAAACAAAGATACAGCATTTAGAAG
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TATGTAGCAAATTCCTACTCAGATACCCCCAGGCCAGCCGATCCTTCGACAGTATCGT
GTGATTCCCCAAGTAATGTTAATGGAGGACCTGGAGTCAAAGGGTTTGGCTTCAAAA
CTGGTGATGATGTATGGCTGGGAAGGACTGTATCAACCAGTGGAAGGTCAGGCTTTG
AAATCATCAAAGTCACAGAGGGGTGGATCAATTCCCCCAATCATGCCAAATCAGTTA
CACAAACATTAGTGTCAAACAATGATTGGTCAGGTTACTCAGGGAGCTTCATTGTTG
AGAACAATGGCTGCTTTTCAGCCCTGCTTCTATATTGAACTTATACGGGGAAGGCCCA
ATAAGAACGATGACGTTTCTTGGACAAGCAACAGTATAGTTACTTTCTGTGGACTAG

ACAATGAACCTGGATCGGGAAATTGGCCTGATGGTTCCAACATTGGGTTTATGCCCA
AGTAACAGAAAAAACCCCTTGTATCTACT

matrix protein 2 (M2) and matrix protein 1 (M1) genes

AGCAAAAGCAGGTAGATATTGAAAGATGAGTCTTCTAACCGAGGTCGAAACGTACGT
TCTCTCTATCATCCCGTCAGGCCCCCTCAAAGCCGAGATCGCGCAGAGACTTGAAGA
TGTCTTTGCAGGGAAAAACACCGATCTCGAGGCTCTCATGGAGTGGCTAAAGACAAG
ACCAATCCTGTCACCTCTGACTAAAGGGATTTTGGGATTTGTGTTTCACGCTCACCGT
GCCCAGTGAGCGAGGACTGCAGCGTAGACGCTTCGTCCAGAATGCCCTAAATGGAAA
TGGGGATCCAAATAATATGGATAAGGCAGTTAAGCTATATAAGAAGCTGAAAAGAGA
GATAACATTCCATGGGGCTAAGGAGGTCGCACTTAGCTACTCAACCGGTGCACTTGC
CAGCTGCATGGGTCTCATATACAACAGGATGGGAACGGTGACTACAGAAGTGGCTTT
TGGCCTAGTGTGTGCCACTTGTGAGCAGATTGCAGATTACAGCATCGGTCCACAG
ACAGATGGCAACCATCACCAACCCATTAATCAGACATGAGAACAGAATGGTGCTGGC
CAGCACTACAGCTAAGGCCATGGAGCAGATGGCAGGATCAAGCGAGCAGGCATCAGA
AGCCATGGAGGTTGCTAATCAGGCCAGGCAGATGGTACAGGCAATGAGGACAATTGG
GACTCATCCTAATTCTAGTGCTGGTCTGAGAGATAATCTTCTTGAAAATTTGCAGGC
CTACCAGAACCGAATGGGAGTGCAGATGCAGCGATTCAAGTGATCCTCTTGTTGTTG
CCGCAAATATCATTGGGATCCTGCACTTGATATTGTGGATCCTTGATCGTCTTTTCT
TCAAATGCATTTATCGTCGCCTTAAATACGGTTTGAAAATAGGGCCTTCTACGGAAG
GGGTACCTGAGTCTATGAGGGAAGAGTACCGGCAGGAACAGCAGAGTGCTGTGGATG
TTGACGATGGTCATTTTGTCAACATAGAATTGGAGTAAAAAACTACCTTGTTTCTAC
T

nuclear export protein (NEP) and nonstructural protein 1 (NS1) genes

AGCAAAAGCAGGGTGACAAAAACATAATGGACTCCAACACTGTGTCAAGCTTTCAGG
TAGACTGCTTTCTTTGGCATGTCCGCAAACGATTTGCAGACCAAGAACTGGGTGATG
CCCCATTCTTGACCGGCTTCGCCGAGACCAGAAGTCCCTAAGAGGAAGAGGCAGCA
CTCTTGGTCTGGACATCGAGACAGCTACTCGTGCGGGAAAGCAAATAGTGGAGCGGA
TTCTGGGGGAAAAATCTGATGAAGCACTTAAAATGAATATTGCTTCTGTACCGACTT
CACGCTACCTAACTGACATGACTCTTGAAGAAATGTCAAGAGACTGGTTCATGCTCA
TGCCCAAGCAGAAAGTAGCAGGTTCTCTCTGCATCAAAATGGACCAGGCAATAATGG
ATAAAACCATCATACTGAAAGCAAATTTTCAGTGTGATTTTTGATCGGCTGGAAACCC
TAATATTACTTAGAGCTTTTACAGAAGAAGGAGCAATTGTGGGAGAAATCTCACCAT
TACCTTCTCTTCCAGGACATACTGATGAGGATGTCAAAATTGCAATTGGGGTCCTCA
TCGGAGGGCTTGAATGGAATGATAACACAGTTCGAGTCTCTGAAACTCTACAGAGAT
TCACTTGGAGAAGCAGTAATGAGGATGGGAGACCTTCACTCCCTTCAAAACAGAAAC

GGAAATGGCGAGAACAATTGAGTCAGAAGTTCGAGGAAATAAGATGGCTGATTGAG
GAAATGCGACATAGATTGAAGACCACAGAGAACAGCTTCGAACAAATAACGTTTATG
CAAGCTTTACAACCTATTGCTTGAAGTGGAGCAAGAGATAAGAACCTTCTCGTTTCAG
CTTATTTAATGATAAAAAACACCCTTGTTTCTACT

A/chicken/Taiwan/a174/2015 (H5N3)

polymerase PB2 (PB2) gene

AGCGAAAGCAGGTCAATTATATTCAATATGGAGAGAATAAAAGAACTAAGAGATTTG
ATGTGCGCAGTCTCGCACTCGCGAGATACTGACAAAGACCACTGTGGACCATATGGCC
ATAATCAAGAAATATACGTGAGGAAGACAGGAGAAGAATCCTGCACTTAGGATGAAA
TGGATGATGGCGATGAAATATCCGATTACAGCAGACAAAAGGATAATGGAAATGATT
CCCGAAAGAAACGAGCAAGGTCAGACTCTTTGGAGCAAAACAAATGATGCTGGATCA
GACAGAGTGATGGTGTACCTCTGGCTGTGACATGGTGGAAATAGAAATGGACCGACA
ACAAGTACAGTCCATTATCCAAAGGTCTATAAAACCTACTTTGAAAAAGTTGAAAGG
TTAAAGCATGGAACCTTCGGCCCTGTCCATTTTCGAAATCAGGTTAAGATACGCCGC
AGGGTTGACATAAACCAGGCCATGCAGATCTCAGTGCTAAAGAAGCACAGACGTC
ATCATGGAGGTCGTTTTCCCAAACGAAGTCGGAGCCAGGATATTGACATCAGAGTCA
CAGTTAACTATAACAAAAGAAAAGAAGGAAGAGCTTCAGGACTGTAAGATTGCCCCT
TTAATGGTGGCATACATGTTGGAAAGAGAACTGGTTCGCAAAACCAGATTCCTGCCA
GTAGCTGGCGGGACAAGCAGCGTGTATATCGAGGTGTTGCACTTGACCCAAGGGACC
TGCTGGGAACAAATGTACACGCCAGGAGGAGAAGTGAGAAATGATGACGTTGATCAG
AGTTTAATTATTGCTGCTAGGAATATCGTTAGGAGAGCAACAGTATCAGCAGATCCA
TTGGCTTCGCTCCTGGAGATGTGCCATAGTACACAAATTGGCGGGACAAGAATGGTA
GACATCCTTAGACAAAACCCAACAGAAGAGCAAGCCGTGGATATATGTAAAGCAGCA
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AGTGGGTCATCTGTCAAAGAGAAGAGGAAGTGCTTACCGGCAACCTCCAAACATTG
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CGAGACCAGAGAGGGAACGTGCTCCTGTCTCCTGAAGAGGTTAGTGAAACACAGGGA
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ACAGAAGACCCAGATGAGGGGACGGCAGGAGTGGAGTCTGCGGTATTAAGAGGGTTC
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AGCAATCTTGCGAAGGGGGAGAAGGCTAATGTGTTGATAGGGCAAGGAGACGTGGTG
TTGGTGATGAAACGGAAACGGGACTCTAGCATACTTACTGACAGCCAGACAGCGACC
AAAAGAATTCGGATGGCCATCAATTAGTGTGCAATAGTTTAAAAACGACCTTGTTTC
TACT

polymerase PB1 (PB1) gene

AGCAAAAGCAGGCAAACCATTTGAATGGATGTCAATCCGACTTTACTTTTCTTAAAA
GTGCCAGCGCAAAATGCTATAAGTACTACATTCCTTACACTGGAGATCCTCCATAC
AGCCATGGAACAGGAACAGGATACACCATGGACACGGTCAACAGAACACATCAATAC
TCAGAGAAAGGAAAGTGGACAACAAACACAGAGACCGGGGCACCCCAACTCAACCCA
ATTGATGGACCATTACCAGAGGACAACGAGCCAAGCGGATATGCACAAACGGATTGC
GTGTTGGAAGCAATGGCTTTTCTTGAAGAATCCCACCCAGGGATTTTTTGAAAACCTCT
TGTCTTGAAACGATGGAAATCGTTCAGCAAACAAGAGTGGACAAATTAACCCAAGGT
CGCCAGACTTATGATTGGACATTGAATAGAAACCAACCAGCTGCGACTGCTTTGGCC
AATACTATAGAGGTCTTCAGATCGAACGGTCTAACAGCCAATGAATCGGGGAGACTA
ATAGATTTCTCTCAAGGATGTGATGGAATCAATGGATAAAGAAGAAATGGAAATAACA
ACACATTTTCAGAGAAAGAGAAGAGTAAGGGACAATATGACCAAGAAGATGGTCACA
CAAAGAACAATAGGAAAGAAGAAGCAAAGGCTGAACAAAAGGAGCTACTTGATAAGA
GCACTGACATTGAACACGATGACCAAAGATGCAGAAAGAGGCAAGTTGAAAAGGCGG
GCAATTGCAACACCCGGGATGCAGATTAGAGGATTCGTGTACTTTGTGCGAAACACTA
GCGAGGAGCATCTGTGAGAACTTGAGCAATCTGGACTCCCCGTTGGAGGGAATGAG
AAGAAGGCTAAATTGGCAAATGTTGTGAGAAAAATGATGACTAACTCACAAGATACA
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CGGATGTTTTTGGCAAATGATAACATACATCACAAGAAACCAACCAGAATGGTTTAGA
AATGTCTTGAGCATTGCCCCATAATGTTCTCAAATAAAATGGCGAGATTGGGGAAA
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ACCAGCCAAAGGGGAATTCTTGAGGATGAGCAGATGTACCAGAAGTGCTGTAGTCTA
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GTGGAGGCCATGGTGTCTAGGGCCCCGAATTGATGCACGCATTGATTTGGAATCTGGA
AGGATTAAGAAAGAAGAGTTTGCTGAGATCATGAAGATCTGTTCCACCATTTGAAGAG
CTCAGACGGCAAAAATAGTGAATTTAGCTTGTCTTCATGAAAAAATGCCTTGTTTC
TACT

polymerase PA (PA) gene

AGCAAAAGCAGGTACTGATCCGAAATGGAAGACTTTGTGCGGCAATGCTTCAATCCA
ATGATCGTCGAGCTTGCGGAAAAGACAATGAAAGAATATGGGGAAAATCCAAAATC
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AATGCATTATTGAAACACCGATTTGAGATAATTGAAGGGAGAGACCGAACGATGGCT
TGGACAGTGGTAAATAGTATCTGCAACACCACAGGAGTCGATAAGCCTAAATTCCCTC
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GAAGTTCACACATACTACCTAGAAAAGGCAAATAAGATAAAATCAGAGAAGACACAC
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GCCAATAGGGGTCTGTGGGATTCCTTTCGTCAATCTGAGAGAGGCGAAGAGACAATT
GAAGAAAGGTTTGAAATCACAGGAACCATGCGCAGGCTTGCCGACCAAAGCCTCCCA
CCGAATTTCTCCAGCCTTGAAAATTTTAGAGCCTATGTGGATGGATTCAAACCGAAC
GGCTGCCTTGAGGGCAAGCTTTCTCAAATGTCAAAAGAAGTGAACGCCAGAATTGAG
CCATTCATGAAGACAACACCACGCCCTCTCAGATTACCTGATGGTCCTCCTTGCTCT

CAGCGGTCGAAATTCTTACTGATGGATTCCCTTAAATTGAGCATCGAAGACCCAAGC
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GAACCTGGGACCTTCGATCTTGGGGGGCTATATGAAGCAATTGAGGAGTGCCTGATT
AATGATCCCTGGGTTTTGCTTAATGCATCTTGGTTCAACTCCTTCCTTACACATGCA
CTGAAATAGTTGTGGCAATGCTACTATTTGCTATCCATACTGTCCAAAAAAGTACCT
TGTTTCTACT

hemagglutinin (HA) gene

AGCAAAAGCAGGGGTTCAATCTGTCAAAATGGAGAAAATAGTGCTTCTTCTTGCAGT
GATTAGCCTTGTTAAAAGTGATCAGATTTGCATTGGTTACCATGCAAACAACCTCAAC
AAAGCAGGTTGACACGATAATGGAGAAAAACGTCACTGTTACACATGCCCAAGACAT
ACTGGAAGAGACACACAACGGGAAGCTCTGCGATCTTAATGGAGTGAAGCCCCTGAT
TCTAAAGGATTGTAGCGTAGCTGGGTGGCTCCTTGGAAATCCAATGTGCGACGAGTT
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AGCAGAGCAGACAAATCTCTATAAAAACCCAGACACTTATGTTTCCGTGGGGACATC
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TGAGAGTAATGGAAATTTTCATTGCTCCAGAATATGCATACAAAATTGTCAAGAAAGG
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AACTCCAATAGGGGCGATAAACTCTAGCATGCCATTCCACAATATACACCCTCTCAC
CATCGGGGAATGCCCCAAATACGTGAAGTCAAACAAATTAGTCCTTGCGACTGGGCT
CAGAAATAGTCCTCTAAGAGAAAGAAGAAGAAAAAGAGGACTATTTGGAGCTATAGC
AGGGTTTATAGAGGGAGGATGGCAGGGAATGGTAGACGGTTGGTATGGGTATCATCA
TAGCAATGAGCAGGGGAGTGGGTACGCTGCAGACAAAGAATCCACCCAAAAGGCAAT
AGATGGAGTTACCAATAAGGTCAACTCAATCATTGACAAAATGAACACTCAATTTGA
GGCCGTTGGAAGGGAATTTAATAACTTAGAAAGGAGAATAGAGAATTTAAACAAGAA
AATGGAAGACGGATTCTTAGATGTCTGGACTTATAATGCTGAACTTTTAGTTCTCAT
GGAAAATGAGAGAACTCTAGATTTCCATGACTCAAATGTCAAGAACCTTTACGACAA
AGTCCGGCTACAGCTTAGGGATAATGCAAAAGAGCTGGGTAATGGTTGTTTCGAGTT
CTATCACAAATGTGATAACGAATGTATGGAGAGCGTAAGAAATGGGACGTATGACTA
CCCTAAGTATTCAGAAGAAGCAATATTTAAAAGAGAAGAAATAAGCGGAGTGAAATT
AGAATCAATAGGAACTTACCAAATACTGTCAATTTATTCAACAGTGGCGAGTTCCCT
AGCACTGGCAATCATAGTGGCTGGTCTATCTTTATGGATGTGCTCTAATGGGTGCTT
ACAATGCAGAAATTTGCATCTAAATTTGTGAGCTCAGATTGTAATTTAAAACACCCTT
GTTTCTACT

nucleocapsid protein (NP) gene

AGCAAAAGCAGGGTAGATAATCACTCACTGAGTGACATCAACATCATGGCGTCTCAA
GGCACCAAACGATCTTATGAACAGATGGAACTGGTGGAGAACGCCAGAATGCCACT
GAAATCAGGGCATCTGTTGGAAGGATGGTTGGTGGAAATTGGGAGGTTTTACATACAG
ATGTGCACTGAACTCAAACCTCAGCGACTATGAAGGGAGGCTGATCCAGAACAGCATA
ACAATAGAGAGAATGGTTCTTTCTGCATTTGATGAAAGGAGGAACAAATACCTGGAA
GAGCATCCCAGTGCTGGAAAGGATCCGAAGAAAACCTGGAGGTCCAATTTATCGAAGA
AGGGACGGGAAATGGATGAGAGAGCTGATTCTGTATGACAAAGAGGAGATCAGGAGA
ATCTGGCGTCAAGCGAATAATGGAGAAGACGCAACTGCTGGTCTCACTCACCTGATG
ATCTGGCATTCCAACCTAAATGATGCCACATACCAGAGAACCAGAGCTCTTGTGCGC
ACTGGGATGGACCCAGAAATGTGCTCTCTGATGCAAGGGTCAACTCTCCCAGAGAGA
TCTGGAGCTGCTGGAGCAGCAGTAAAGGGAGTCGGGACGATGGTGATGGAACATAATT
CGAATGATAAAAACGAGGAATTAATGATCGGAATTTCTGGAGAGGCGAAAATGGACGA
AGAACAAGGATTGCATATGAGAGGATGTGCAACATCCTCAAAGGGAAATTCCAAACA
GCAGCACAAAGAGCAATGATGGATCAAGTGCAGAGAAAGCAGAAATCCTGGGAATGCT
GAAATTGAAGATCTCATCTTCCTGGCACGGTCTGCGCTCATCCTGAGAGGATCAGTG

CCCCATAAGTCCTGCCTTCCTGCTTGTGTGTACGGCCTTGCTGTGGCCAGTGGGTAT
GATTTTGAGAGAGAAGGGTACTCTCTAGTTGGAATAGATCCTTTCCGTCTGCTTCAA
AACAGCCAGGTCTTCAGTCTCATTAGACCAAATGAGAACCCAGCACACAAGAGTCAA
TTGGTGTGGATGGCATGCCATTCTGCAGCATTTGAGGACCTGAGAGTCTCAAGTTTC
ATCAGAGGGACAAGAGTGGTCCCAAGAGGGCAACTATCCACTAGAGGAGTTCAAATT
GCTTCAAATGAGAACATGGAACAATGGACTCCAGCACTCTTGAAC TAAGGAGCAGA
TATTGGGCTATAAGGACCAGGAGTGGAGGAAACACCAACCAACAGAGAGCATCTGCA
GGACAGATCAGTGTACAGCCTACTTTCTCAGTACAGAGAAGTCTTCCCTTCGAAAGG
GCAACCATTATGGCGGCATTACAGGAAATACTGAAGGCAGAACATCTGACATGAGG
ACTGAAATCATAAGAATGATGGAAAGTGCCAGACCAGAAGATGTGTCCTTCCAGGGG
CGGGGAGTCTTCGAGCTCTCGGACGAAAAGGCAACGAACCCGATCGTGCCTTCCTTT
GACATGAGTAATGAAGGATCTTATTTCTTCGGAGACAATGCAGAGGAGTATGACAAT
TAAAGAAAAATACCCTTGTTTCTACT

neuraminidase (NA) gene

AGCAAAAGCAGGAGTTTAAATGAATCCAAATCAGAAGATAATAACAATTGGTGTAG
TGAATACTACTCTATCAACAATAGCCCTTCTTATTGGAATTGGGAATCTGATCTTCA
ACACTGTCATACATGAGAAAAATAGGGGACCACCAAATGTGGTATATCCAACAATAA
CAGCCCCAGTGGTACCAAATGCAGTGACACCACAATCACATACAACAACACTGTGG
TACATAACATAACAACGACAATAATAACCGAAGCGGAAAAGCATTTCAAATCCTCAC
TGCCGCTATGCCCCTTCCGAGGTTTCTTCCCCTTTCACAAGGACAATGCAATACGAT
TGGGTGAGAACAAAGACGTAATAGTCACAAGGGAGCCCTATGTCAGTTGTGACAATG
ATAATTGCTGGTCTTTTGCCCTCGCTCAAGGGGCTCTACTGGGGACTAAACACAGCA
ATGGAACCATCAAGGACAGGACGCCATATAGATCGCTGATCCGGTTCCTCAATAGGAA
CAGCTCCAGTACTGGGCAATTACAAAGAGATATGTGTTGCCTGGTCAAGTAGCAGTT
GCTTCGATGGAAAGGAATGGATGCATGTTTGCATGACTGGGAACGACAATGATGCGA
GTGGCCAAATAATATATGCAGGGAAAATGACAGACTCCATTAAATCATGGAGAAAGG
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CTGTAACAGATGGTCTGCGGCTAATAGTGCAGACCACCGGATTTACTGGATACGAG
AAGGTAAGGTAATGAAGTATGAAAACATTCCTAAACAAAGATACAGCATTTAGAAG
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GTTCTAATAGGCCCTGGATGAGGATCAACAATGAGACCATACTAGAAACAGGGTACG
TATGTAGCAAATTCCTCAGATACCCCCAGGCCAGCCGATCCTTCGACAGTATCGT
GTGATTCCCCAAGTAATGTTAATGGAGGACCTGGAGTCAAAGGGTTTGGCTTCAAAA
CTGGTGATGATGTATGGCTGGGAAGGACTGTATCAACCAGTGGAAGGTCAGGCTTTG
AAATCATCAAAGTCACAGAGGGGTGGATCAATTCCTCCCAATCATGCCAAATCAGTTA
CACAAACATTAGTGTCAAACAATGATTGGTCAGGTTACTCAGGGAGCTTCATTGTTG
AGAACAATGGCTGCTTTCAGCCCTGCTTCTATATTGAACTTATACGGGGAAGGCCCA



ATAAGAACGATGACGTTTCTTGGACAAGCAACAGTATAGTTACTTTCTGTGGACTAG
ACAATGAACCTGGATCGGGAAATTGGCCTGATGGTTCCAACATTGGGTTTATGCCCA
AGTAACAGAAAAAACCTTGTATCTACT

matrix protein 2 (M2) and matrix protein 1 (M1) genes

AGCAAAAGCAGGTAGATATTGAAAGATGAGTCTTCTAACCGAGGTCGAAACGTACGT
TCTCTCTATCATCCCGTCAGGCCCCCTCAAAGCCGAGATCGCGCAGAGACTTGAAGA
TGTCTTTGCAGGGAAAAACACCGATCTCGAGGCTCTCATGGAGTGGCTAAAGACAAG
ACCAATCCTGTCACCTCTGACTAAAGGGATTTTGGGATTTGTGTTACGCTCACCGT
GCCCAGTGAGCGAGGACTGCAGCGTAGACGCTTCGTCCAGAATGCCCTAAATGGAAA
TGGGGATCCAAATAATATGGATAAGGCAGTTAAGCTATATAAGAAGCTGAAAAGAGA
GATAACATTCCATGGGGCTAAGGAGGTCGCACTTAGCTACTCAACCGGTGCACTTGC
CAGCTGCATGGGTCTCATATACAACAGGATGGGAACGGTGACTACAGAAGTGGCTTT
TGGCCTAGTGTGTGCCACTTGTGAGCAGATTGCAGATTACAGCATCGGTCCCACAG
ACAGATGGCAACCATCACCAACCCATTAATCAGACATGAGAACAGAATGGTGCTGGC
CAGCACTACAGCTAAGGCCATGGAGCAGATGGCAGGATCAAGCGAGCAGGCATCAGA
AGCCATGGAGGTTGCTAGTCAGGCCAGGCAGATGGTACAGGCAATGAGGACAATTGG
GACTCATCCTAATTCTAGTGCTGGTCTGAGAGATAATCTTCTTGAAAATTTGCAGGC
CTACCAGAACCGAATGGGAGTGCAGATGCAGCGATTCAAGTGATCCTCTTGTTGTTG
CCGCAAATATCATTGGGATCCTGCACTTGATATTGTGGATCCTTGATCGTCTTTTCT
TCAAATGCATTTATCGTCGCCTTAAATACGGTTTGAAAATAGGGCCTTCTACGGAAG
GGGTACCTGAGTCTATGAGGGAAGAGTACCGGCAGGAACAGCAGAGTGCTGTGGATG
TTGACGATGGTCATTTTGTCAACATAGAATTGGAGTAAAAAACTACCTTGTCTTCTAC
T

nuclear export protein (NEP) and nonstructural protein 1 (NS1) genes

AGCAAAAGCAGGGTGACAAAAACATAATGGACTCCAACACTGTGTCAAGCTTTCAGG
TAGACTGCTTTCTTTGGCATGTCCGCAAACGATTTGCAGACCAAGAACTGGGTGATG
CCCCATTCTTGACCGGCTTCGCCGAGACCAGAAGTCCCTAAGAGGAAGAGGCAGCA
CTCTTGGTCTGGACATCGAGACAGCTACTCGTGCGGGAAAGCAAATAGTGAGCGGA
TTCTGGGGGAAAAATCTGATGAAGCACTTAAAATGAATATTGCTTCTGTACCGACTT
CACGCTACCTAACTGACATGACTCTTGAAGAAATGTCAAGAGACTGGTTCATGCTCA
TGCCCAAGCAGAAAGTAGCAGGTTCTCTCTGCATCAAAATGGACCAGGCAATAATGG
ATAAAACCATCATACTGAAAGCAAATTTCAAGTGTGATTTTTGATCGGCTGGAAACCC
TAATATTACTTAGAGCTTTCACAGAAGAAGGAGCAATTGTGGGAGAAATCTCACCAT
TACCTTCTCTTCCAGGACATACTGATGAGGATGTCAAAATTGCAATTGGGGTCTCTCA
TCGGAGGGCTTGAATGGAATGATAACACAGTTCGAGTCTCTGAAACTCTACAGAGAT



TCACCTTGGAGAAGCAGTAATGAGGATGGGAGACCTTCACTCCCTTCAAAACAGAAAC
GGAAATGGCGAGAACAATTGAGTCAGAAGTTCGAGGAAATAAGATGGCTGATTGAG
GAAATGCGACATAGATTGAAGACCACAGAGAACAGCTTCGAACAAATAACGTTTATG
CAAGCTTTACAACCTATTGCTTGAAGTGGAGCAAGAGATAAGAACCTTCTCGTTTCAG
CTTATTTAATGATAAAAAACACCCTTGTTTCTACT

A/chicken/Taiwan/a288/2015 (H5N2)

polymerase PB2 (PB2) gene

AGCAAAAGCAGGTCAATTATATTCAATATGGAGAGAATAAAAGAACTAAGAGACTTG
ATGTCGCATTCTCGCACTCGCGAGATACTGACAAAACCACTGTGGACCATATGGCC
ATAATTAAGAAATACACATCAGGAAGACAGGAGAAGAATCCTGCCCTTAGGATGAAA
TGGATGATGGCAATGAAATATCCGATTACAGCCGACAAAAGAATAATGGAAATGATC
CCCGAAAGAAATGAGCAAGGTCAAATTCTCTGGAGCAAAACAAATGATGCTGGATCA
GACAGAGTGATGGTATCACCTCTGGCTGTAACATGGTGGGAATAGAAATGGGCCGACG
ATAAGTACAGTCCACTATCCAAAGGTCTACAAAACCTTACTTTGAAAAAGTCGAAAGG
TTGAAACATGGAACCTTTGGTCCTGTTCACCTTCGAAATCAGGTTAAAATACGCCGC
AGGGTTGACATAAACCCGGGCCATGCAGATCTCAGTGCCAAAGAAGCACAGGATGTC
ATCATGGAGGTCGTTTTCCCAAACGAAGTTGGAGCCAGGATATTGACATCAGAGTCA
CAATTAACAATAACAAAGGAGAAGAAGGAGGAGCTTCAGGACTGTAAAATCGCTCCT
TTGATGGTGGCATAACATGTTGGAGAGAGAACTGGTTCGCAAAACCAGATTTCTACCA
GTAGCTGGCGGAACAAGCAGCGTGTATATCGAGGTATTGCATTTGACTCAGGGGACC
TGCTGGGAACAAATGTACACACCGGGAGGGGAGGTGAGAAATGATGATGTCGATCAG
AGTTTGATCATTGCTGCTAGAAATATTGTTAGGAGGGCAACAGTATCAGCAGACCCG
TTGGCTTCGCTCTTGGAGATGTGCCATAGTACACAAATTGGCGGGATAAGAATGGTG
GATATTCTTAGACAGAACCCAACAGAAGAGCAAGCTGTGGATATATGCAAAGCAGCT
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AGTGGGTCATCTGTCAAAGAGAAGAAGAAGTGCTCACAGGCAACCTCCAAACATTG
AAAATAAGAGTACATGAAGGGTATGAAGAATTCACAATGGTTGGGCGAAGAGCCACA
GCCATTCTAAGGAAGGCAACCAGAAGGCTGATCCAATTAATAGTGAGTGGAAGAGAT
GAGCAGTCAATCGCTGAAACGATTATAGTGGCAATGGTTTTCTCACAAGAGGATTGC
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CGAGATCAGAGGGGAAACGTACTCTTGTCTCCTGAGGAAGTTAGTGAAACACAGGGA
ACAGAGAACTGACGATAACATATTCATCGTCTATGATGTGGGAAATCAATGGTCCG
GAATCAGTGCTAGTCAACACATACCAATGGATCATTAGAAATTGGGAACTGTGAAG
ATTCAATGGTCCCAAGACCCTACAATGTTGTACAATAAGATGGAGTTTGAGCCATTC
CAATCCTTGGTGCCCAAGGCTGCCAGAGGTCAGTATAGTGGATTTGTTAGGACGTTA
TTCCAACAGATGCGTGATGTGCTGGGGACATTTGACACTGTCCAGATAATAAAGCTC
CTACCATTTGCAGCAGCCCCACCAGAACAGAGTAGGATGCAGTTCTCTTCTTTGACT
GTGAATGTAAGAGGTTTCAGGAATGAGAATCCTTGTGAGAGGCAACTCCCCTGTGTTT
AACTACAACAAGACAACCAAGAGACTCACAGTCCTTGGAAAGGATGCAGGTGCATTG
ACAGAAGATCCAGATGAGGGAACAGCAGGAGTGAATCTGCGGTATTAAGAGGATTT
CTAATTCTGGGCAAAGAAGACAAAAGATATGGACCAGCATTGAGCATCAATGAATTG
AGCAATCTTGCGAAAGGGGAGAAGGCTAATGTGTTGATAGGGCAAGGAGACGTGGTG
TTGGTAATGAAACGGAAACGGGACTCTAGCATACTTACTGACAGCCAGACAGCGACC
AAAAGGATTCGGATGGCCATCAATTAGTGTGCAATAGTTTAAAAACGACCTTGTTTC
TACT

polymerase PB1 (PB1) gene

AGCAAAAGCAGGCAAACCATTTGAATGGATGTCAATCCGACTTTACTTTTCTTAAAA
GTGCCAGCGCAAAATGCTATAAGCACTACATTCCCTTACACTGGAGATCCTCCATAT
AGCCATGGAACAGGGACAGGATACACCATGGACACAGTCAACAGAACACATCAATAC
TCAGAAAGGGGAAAGTGGACAACAAACACAGAAACCGGAGCGCCTCAACTCAACCCA
ATTGATGGACCATTACCTGAGGACAACGAGCCAAGCGGATACGCACAAACAGATTGC
GTATTGGAAGCAATGGCTTTCCTTGAAGAATCCCACCCAGGGATCTTTGAAAACCTCT
TGTCTTGAAACGATGGAAGTCGTTTCAGCAAACAAGAGTGGACAAACTAACCCAAGGT
CGCCAGACTTATGACTGGACACTAAAATAGAAATCAACCAGCTGCAACTGCTTTGGCC
AATACTATAGAGGTCTTCAGATCGAACGGTATGACAGCCAATGAGTCAGGGAGATTA
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ACACATTTCCAGAGAAAGAGAAGAGTGAGAGACAACATGACCAAGAAGATGGTCACA
CAAAGAACAATAGGGAAGAAGAAGCAGAGGCTGAACAAGAGGAGTTATTTAATAAGA
GCACTGACACTGAACACAATGACAAAAGATGCAGAACGGGGCAAATTGAAGAGGCGA
GCAATTGCAACACCTGGGATGCAGATTAGAGGATTCGTGTACTTTGTTGAAACACTA
GCGAGGAGCATTTGTGAGAACTCGAACAACTCTGGACTCCCTGTTGGAGGGAATGAA
AAGAAGGCTAAATTAGCAAATGTCTGTGAGAAAGATGATGACTAACTCACAAGACACA
GAGCTCTCTTTACAAATCACTGGAGACAACACCAAATGGAATGAGAATCAGAATCCT
CGGATGTTTTTGGCAATGATAACATACATCACAAGAAACCAACCTGAATGGTTTTAGA
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CTTGCAAACATTGACTTGAAATACTTCAACGAGTCAACAAGAAAGAAAATCGAGAAG
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AGAGGCGATACACAAATTCAAACGAGGAGATCATTCGAGCTGAAGAAGCTATGGGAG
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ATCCGGAATCTCCACATCCCAGAGGTCTGTTTGAATGGGAACTGATGGATGAAGAT
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TCCGTAAACAACGCTGTGGTGATGCCAGCCCATGGTCCAGCCAAGAGCATGGAATAT
GATGCTGTTGCGACTACACATTCATGGATTCCCAAGAGAAACCGTTCCATTCTCAAT
ACCAGCCAAAGGGGAATCCTTGAGGATGAGCAGATGTACCAGAAGTGCTGCAGTCTA
TTCGAGAAATTCTTCCCCAGTAGTTCATACAGGAGGCCAGTTGGAATTTCCAGCATG
GTGGAGGCCATGATGTCTAGGGCCCGAATTGATGCACGCATTGATTTCTGAGTCTGGA
AGGATTAAGAAAGAAGAGTTTGCTGAGATCATGAAGATCTGTTCCACCATTGAAGAG
CTCAGACGGCAAAAATAGTGAATTTAGCTTGTCTTCATGAAAAAATGCCTTGTTTC
TACT

polymerase PA (PA) gene

AGCAAAAGCAGGTACTGATCCGAAATGGAAGACTTTGTGCGACAATGCTTCAATCCA
ATGATTGTCTGAGCTTGCGGAAAAGGCAATGAAAGAATATGGGGAAGATCCGAAAATC
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TGGACAGTGGTGAATAGCATCTGCAACACCACAGGGGTGACAAAGCCTAAATTCCTC
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GAAGTTCACATATACTATCTAGAAAAAGCCAACAAGATAAAATCGGGGAAAACACAC
ATTCACATATTCTCATTCCTGAGAGGAGATGGCCACCAAAGCGGACTTACTCTT
GATGAAGAGAGCAGAGCAAGAATCAAAACCAGGCTGTTCACTATAAGGCAAGAAATG
GCCAGTAGGGGTCTATGGGACTCCTTTCGTCTAGTCCGAGAGAGGCGAAGAGACAATT
GAAGAAAGATTTGAAATCACAGGAACCATGCGCAAGCTTGCCGACCAAAGTCTCCCA
CCGAATCTCTCAGCTTTGAAAACCTTAGAGCCTATGTGGATGGATTCTGAACCGAAC
GGCTGCATTGAGGGCAAGCTTTCTCAAATGTCAAAGAAGTGAACGCCAGAATTGAG



CCATTTCTGAAGACAACACCACGCCCTCTCAGATTACCTGATGGGCCTCCCTGCTCT
CAGCGGTCTGAAGTTCTTGCTGATGGATGCCCTCAAATTAAGCATCGAAGACCCGAGC
CATGAGGGGGAAGGCATACCACTATATGATGCAATCAAATGCATGAAGACATTTTTC
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GAAGTATCCCATTTGCAGGGCCACTGAATACATAATGAAGGGAGTGACATAAACACA
GCCCTGCTAAATGCATCCTGTGCAGCCATGGATGACTTCCAATTGATTCCAATGATA
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TTCTCTCTTACTGACCCGAGGCTGGAGCCGAAAAGTGGGAAAAGTACTGTGTTATC
GAGATAGGAGACATGCTCCTACGGACTGCAATAGGCCAAGTGTCAAGGCCCATGTTC
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TCTGTCAAAGAGAAGGACATGACCAAAGAATTCTTTGAGAACAAATCAGAAACATGG
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ACATTACTAGCAAAGTCTGTGTTCAACAGTCTATATGCATCTCCACAATTAGAGGGA
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GAACCTGGGACCTTCGATCTTGGGGGGCTATATGAAGCAATTGAGGAGTGCCTGATT
AATGATCCCTGGGTTTTGCTTAATGCGTCTTGGTTCAACTCCTTCCTCACACATGCA
CTGAGATAGTTGTGGCAATGCTACTATTTGCTATCCATACTGTCCAAAAAAGTACCT
TGTTTCTACT

hemagglutinin (HA) gene

AGCAAAAGCAGGGGTTCAATCTGTCAAAATGGAGAAAATAGTGCTTCTTCTTGCAGT
GATTAGCCTTGTTAAAAGTGATCAGATTTGCATTGGTTACCATGCAAACAACCTCAAC
AAAGCAGTTGACACGATAATGGAGAAAAACGTCACTGTTACACATGCCCAAGACAT
ACTGGAAAAGACACACAACGGGAAGCTCTGCGATCTTAATGGAGTGAAGCCCCTGAT
TCTAAAGGATTGTAGCGTAGCTGGGTGGCTCCTTGGAATCCAATGTGCGACGAGTT
CATCAGGGTGCCGGAATGGTCTTACATCGTGGAGAGGGCTAACCCAGCCAACGACCT
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AAATCATTTTGAAGAACTCTGATCATCCCCAGGAGTTCTTGGCCCAATCATGAATC
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TAATACCAATCGGGAAGATCTTTTGATACTGTGGGGGATTCATCATTCCAACAATGC
AGCAGAGCAGACAAATCTCTATAAAAACCCAGACACTTATGTTTCCGTGGGGACATC
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TGAGAGTAATGGAAATTTTCATTGCTCCAGAATATGCATACAAAATTGTCAAGAAAGG
GGA CTCAACAATTATGAAAAGTGAAATGGAGTATGGCCACTGCAACACCAAATGTCA
AACTCCAATAGGGGCGATAAACTCTAGCATGCCATTCCACAATATACACCCTCTCAC
CATCGGGGAATGCCCCAAATACGTGAAGTCAAACAAATTAGTCCTTGCGACTGGGCT
CAGAAATAGTCCTCTAAGAGAAAGAAGAAGAAAAAGAGGACTATTTGGAGCTATAGC
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CTATCACAATGTGATAACGAATGTATGGAGAGCGTAAGAAATGGGACGTATGACTA
CCCTAAGTATTCAGAAGAAGCAATATTAAAAAGAGAAGAAATAAGCGGAGTGAAATT
AGAATCAATAGGAACTTACCAATACTGTCAATTTATTCAACAGTGGCGAGTTCCCT
AGCACTGGCAATCATAGTGGCTGGTCTATCTTTATGGATGTGCTCTAATGGGTCGTT
ACAATGCAGAAATTTGCATCTAAATTTGTGAGCTCAGATTGTAATTAAAAACACCCTT
GTTTCTACT

nucleocapsid protein (NP) gene

AGCAAAAGCAGGGTAGATAATCACTCACTGAGTGACATCAACATCATGGCGTCTCAA
GGCACCAAACGATCTTATGAGCAGATGGAACTGGTGGAGAACGCCAGAATGCCACT
GAAATCAGAGCATCTGTTGGAAGGATGGTTAGTGGAATTGGGAGGTTTTACATACAG
ATGTGCACTGAACTCAAACCTCAGCGACTATGAAGGGAGGCTGATCCAGAACAGCATA
ACAATAGAGAGAATGGTTCTCTCGGCATTTGATGAAAGGAGGAACAAATACCTGGAA
GAGCATCCCAGTGCCGGAAAGGATCCGAAGAAAACCTGGAGGTCCAATTTATCGAAGA
AGGGACGGGAAATGGGTGAGAGAGCTGATTCTGTATGACAAAGAGGAGATCAGGAGA
ATCTGGCGTCAAGCAAATAATGGAGAAGACGCAACTGCTGGTCTCACTCACCTGATG
ATCTGGCATTCCACTTAAATGATGCCACATACCAGAGAACCAGAGCTCTCGTGCGC
ACTGGGATGGACCCCGAATGTGCTCTCTGATGCAAGGATCAACTCTCCCGAGGAGA
TCTGGAGCTGCTGGCGCAGCAGTAAAGGGAGTCGGGACGATGGTGATGGAACATAATT
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GCTTCAAATGAGAACATGGAAACAATGGACTCCAGCACTCTTGAAGTGAAGCAGA
TATTGGGCTATAAGGACCAGGAGTGGAGGAAACACCAACCAGCAGAGAGCATCTGCA
GGACAGATCAGTGTACAGCCTACTTTCTCAGTACAGAGAAGTCTCCCCTTCGAAAGA
GCAACCATTATGGCGGCATTACAGGAAATACTGAAGGCAGAACATCTGACATGAGG
ACTGAAATCATAAGAATGATGGAGAGTGCCAGACCAGAAGATGTGTCCTTCCAGGGG
CGGGGAGTCTTCGAGCTCTCGGACGAAAAGGCAACGAACCCGATCGTGCCTTCCTTT
GACATGAGTAATGAAGGATCTTATTTCTTCGGAGACAATGCAGAGGAGTATGACAAT
TAAAGAAAAATACCCTTGTTTCTACT

neuraminidase (NA) gene

AGCAAAAGCAGGAGTGAAAATGAACCCAAACCAGAAGATAATAACAATTGGCTCTGT
CTCTCTAACCATTGCAACAGTATGTTTCCTCATGCAAATTGCCATCCTAGCAACGAC
TGTAACACTGCACTTCAAGCAGAATGAATGCAGCATTCCTTCGAACAATCAAGTAGT
GCCATGTGAGCCAATCATAATAGAAAGGAACATAACAGAGATAGTGTATTTGAATAA
CACCATCATAGAAAAAGAACTTTGCCCTAAATTGGCAGAATACAGGGACTGGTCGAA
ACCACAGTGTGAGATCACAGGGTTTGCTCCTTTCTCCAAGGACAACTCAATCCGACT
TTCTGCTGGTGGGGACATTTGGGTAACAAGAGAACCCTTATGTATCATGCAGTCCCAA
TAAATGTTATCAGTTTGCACTCGGTGAGGGAACACGCTAGACAACAAACATTCAAA
TGGCACAATACATGATAGAATTCCCCATCGAACCCCTTTTAATGAACGAGTTGGGTGT
TCCATTCCATTTGGGGACCAAACAAGTGTGCATAGCATGGTCAAGCTCAAGCTGCCA
TGATGGAAGAGCATGGCTACACATTTGTGTTACTGGGGATGACAGGAATGCAACCGC
CAGTTTCATTTATAATGGGGTGCTTGTTGACAGTATTAGTTCATGGTCTCAAAACAT
TCTCAGAACTCAGGAGTCAGAGTGCCTCTGCATCAATGGAACCTGTACAGTAGTAAT
GACTGATGGAAGTGCATCAGGAAGGGCCGATACTAGAGTACTATTCATTAAAGAGGG
GAAAATTGTTTCATATCAGTCCATTATCAGGAAGTGCTCAGCATATAGAGGAGTGTTT
CTGTTATCCCCGCTATCCAGACGTCAGATGTGTCTGCAGAGACAATTGGAAAGGTTC
AAATAGGCCCCGTTATAGATATAAGTATGGCAGATTATAGCATTGATTCTAGTTATGT
GTGCTCAGGGCTTGTTGGAGACACACCGAGAAACGATGATAGCTCTAGCAATAGTAA
CTGCAAGGATCCTAATAATGAGAGAGGGAGCCAGGAGTAAAAGGGTGGGCATTTGA
CTATGGAAATGATGTTTGGATGGGAAGAACAATCAGCAAGGATTCTCGCTCAGGTTA
TGAGACCTTCAGAGTCATTGAAGGTTGGACAACAGCTAATTCCAAATCTCAAGTAAA
TAGACAAGTCATAGTTGACAATAATAACTGGTCTGGTTATTCCGGCATTTTCTCTGT

TGAAGGTAAAAGCTGCATCAATAGGTGTTTTATGTGGAGTTGATAAGAGGAAGGCC
ACAAGAGACTAGAGTGTGGTGGACCTCAAACAGTATTGTTGTGTTCTGTGGAACCTC
AGGTACTTATGGAACAGGCTCATGGCCTGATGGGGCGAATATCAATTTTATGCCTAT
ATAAGCTTTCGCAATTTTAGAAAAAACTCCTTGTTTCTACT

matrix protein 2 (M2) and matrix protein 1 (M1) genes

AGCAAAAGCAGGTAGATATTGAAAGATGAGTCTTCTAACCGAGGTCGAAACGTACGT
TCTCTCTATCATCCCGTCAGGCCCCCTCAAAGCCGAGATCGCGCAGAGACTTGAAGA
TGTCTTTGCAGGGAAAAACACCGATCTCGAGGCTCTCATGGAGTGGCTAAAGACAAG
ACCAATCCTGTCACCTCTGACTAAAGGGATTTTGGGATTTGTGTTTCACGCTCACCGT
GCCCAGTGAGCGAGGACTGCAGCGTAGACGCTTCGTCCAGAATGCCCTAAATGGAAA
TGGGGATCCAAATAATATGGATAAGGCAGTTAAGCTATATAAGAAGCTGAAAAGAGA
GATAACATTCCATGGGGCTAAGGAGGTCGCACTTAGCTACTCAACCGGTGCACTTGC
CAGCTGCATGGGTCTCATATACAACAGGATGGGAACGGTGACTACAGAAGTGGCTTT
TGGCCTAGTGTGTGCCACTTGTGAGCAGATTGCAGATTACAGCATCGGTCCACAG
ACAGATGGCAACCATCACCAACCCATTAATCAGACATGAGAACAGAATGGTGCTGGC
CAGCACTACAGCTAAGGCCATGGAGCAGATGGCAGGATCAAGCGAGCAGGCATCAGA
AGCCATGGAGGTTGCTAATCAGGCCAGGCAGATGGTACAGGCAATGAGGACAATTGG
GACTCATCCTAATTCTAGTGCTGGTCTGAGAGATAATCTTCTTGAAAATTTGCAGGC
CTACCAGAACCGAATGGGAGTGCAGATGCAGCGATTCAAGTGATCCTCTTGTTGTTG
CCGCAAATATCATTGGGATCCTGCACTTGATATTGTGGATCCTTGATCGTCTTTTCT
TCAAATGCATTTATCGTCGCCTTAAATACGGTTTGAAAATAGGGCCTTCTACGGAAG
GGGTACCTGAGTCTATGAGGGAAGAGTACCGGCAGGAACAGCAGAGTGCTGTGGATG
TTGACGATGGTCATTTTGTCAACATAGAATTGGAGTAAAAAACTACCTTGTTTCTAC
T

nuclear export protein (NEP) and nonstructural protein 1 (NS1) genes

AGCAAAAGCAGGGTGACAAAACATAATGGATTCCAACACTGTGTCAAGCTTTCAGG
TAGACTGCTTTCTTTGGCATGTCCGCAAACGATTTGCAGACCAAGAACTGGGTGATG
CCCCATTCTTGACCGGCTTCGCCGAGATCAGAAGTCCCTAAGAGGAAGAGGCAGCA
CTCTTGGTCTGGACATCGAGACAGCTACTCGTGCGGGAAAGCAGATAGTGGAGCGGA
TTCTGGAAGAAGAATCTGATGAGGCACTTAAAATGACTATTGCTTCAGTGTGGCTT
CACGCTACCTAACAGATATGACTCTTGAAGAGATGTCAAGGGACTGGTTCATGCTCA
TGCCCAAACAGAAAGTGGCAGGTTCCCTTTGCATCAGAATGGACCAGGCAACAATGG
ATAAAAACATCACATTAAAAGCAAACCTCAGTGTGATTTTTGACCGGCTGGAGACCC
TAATACTACTTAGGGCTTTTACAGAAGAAGGAGCAATTGTGGGAGAAATCTCACCAT
TACCTTCTCTTCCAGGACATACTGATGAGGATGTCAAAAATGCAATTGGGGTCCTCA



TCGGAGGACTTGAATGGAATGGTAACACAGTTCGAGTCTCTGAGACTCTACAGAGAT
TCGCTTGGAGAAGCAGTAATGAGGATGGGAGACCTCCACTCCCTCCAAAGCAGAAAC
GGAAAATGGCGAGAACAATTGAGTCAGAAGTTTGAAGAAATAAGATGGCTGATTGAA
GAAGTGCGACATAGGTTGAAGATTACAGAGAACAGTTTCGAACAAATAACGTTTATG
CAAGCCTTACAACCTATTGCTTGAAGTGAGCAAGAGATGAGAACTTTCTCGTTTCAG
CTTATTTAATGATAAAAAACACCCTTGTTTCTACT

A/chicken/Taiwan/b214/2015 (H5N8)

polymerase PB2 (PB2) gene

AGCGAAAGCAGGTCAATTATATTCAATATGGAGAGAATAAAAGAACTAAGAGATTTG
ATGTTCGCAGTCTCGCACTCGCGAGATACTGACAAAGACCACTGTGGACCATATGGCC
ATAATCAAGAAATATACGTCAGGAAGACAGGAGAAGAATCCTGCACTTAGGATGAAA
TGGATGATGGCGATGAAATATCCGATTACAGCAGACAAAAGGATAATGGGAATGATT
CCCGAAAGAAACGAGCAAGGTCAGACTCTTTGGAGCAAAACAAATGATGCTGGATCA
GACAGAGTGATGGTGTACCTCTGGCTGTGACATGGTGGAAATAGAAATGGACCGACA
ACAAGTACAGTCCATTATCCAAAGGTCTATAAAACCTACTTTGAAAAAGTTGAAAGG
TTAAAGCATGGAACCTTCGGCCCTGTCCATTTTCGAAATCAGGTTAAGATACGCCGC
AGGGTTGACATAAACCAGGCCATGTAGATCTCAGTGCTAAAGAAGCACAGACGTC
ATCATGGAGGTCGTTTTCCCAAACGAAGTCGGAGCCAGGATATTGACATCAGAGTCA
CAGTTAACTATAACAAAAGAAAAGAAGGAAGAGCTTCAGGACTGTAAGATTGCCCT
TTAATGGTGGCATACATGTTGGAAAGAGAACTGGTTCGCAAAACCAGATTCCTGCCA
GTAGCTGGCGGGACAAGCAGCGTGTATATCGAGGTGTTGCACTTGACCCAAGGGACC
TGCTGGGAACAAATGTACACGCCAGGAGGAGAAGTGAGAAATGATGACGTTGATCAG
AGTTTAATTATTGCTGCTAGGAATATCGTTAGGAGAGCAACAGTATCAGCAGATCCA
TTGGCTTCGCTCCTGGAGATGTGCCATAGTACACAAATTGGCGGGACAAGAATGGTA
GACATCCTTAGACAGAACCCAACAGAAGAGCAAGCCGTGGATATATGTAAAGCAGCA
ATGGGTCTAAGAATCAGTTCATCTTTCAGCTTTGGAGGTTTCACTTTCAAAGGACA
AGTGGGTCATCTGTCAAAGAGAAGAGGAAGTGCTTACCGGCAACCTCCAAACATTG
AAAATAAGGGTGCATGAAGGGTATGAGGAATTCACAATGGTTGGGCGAAGAGCAACA
GCCATTCTAAGGAAAGCAACCAAAAGATTGATCCAATTGATAGTGAGTGGAAGAGAC
GAGCAGTCAATTGCCGAAGCGATCATAGTTGCAATGGTGTCTCCCAAGAGGATTGC
ATGATAAAAGCAGTACGGGGTGATTTGAATTTTCGTCAATAGAGCGAATCAGCGGCTC
AATCCTATGCATCAACTCTTGAGGCATTTCCAGAAGGATGCAAAGGTACTGTTCCAA
AACTGGGGAATTGAACCCATTGACAATGTCATGGGGATGATAGGAATATTGCCTGAC



ATGACACCCAGCACAGAGATGTCACTAAGAGGAGTGAGAGTCAGTAAATGGGAGTG
GATGAATATTCCAGTACTGAGAGGGTGGTCGTGAGCATTGATCGTTTCTTGAGGGTC
CGAGACCAGAGAGGGAACGTGCTCCTGTCTCCTGAAGAGGTTAGTGAAACACAGGGA
ACAGAGAAGCTGACGATAACATATTCATCATCTATGATGTGGGAAATTAATGGCCCG
GAATCAGTGTTAGTTAACACATACCAATGGATCATTAGAACTGGGAACTGTGAAG
ATTCAGTGGTCCCAAGATCCTACAATGCTATACAACAAGATGGAGTTTGAGCCCTTT
CAGTCCTTGGTGCCTAAGGCTGCCAGAGGCCAGTATAGTGGATTTGTGAGGACACTA
TTTCAGCAGATGCGTGATGTGCTGGGGACCTTTGACACAGTCCAGATAATAAAGCTA
CTGCCATTTGCAGCAGCCCCACCGGAGCAAAGTAGGATGCAGTTCTCTTCTCTAACT
GTGAACGTAAGAGGTTTCAGGAATGAGAATACTTGTGAGAGGCAATTCCCCTGTGTTC
AACTATAACAAGGCAACCAAGAGGCTTACAGTCCTTGGAAAGGATGCAGGTGCATTG
ACAGAAGACCCAGATGAGGGGACGGCAGGAGTGGAGTCTGCGGTATTAAGAGGGTTC
CTAATTCTGGGCAAAGAAGACAAAAGATATGGACCAGCATTGAGCATCAATGAATTG
AGCAATCTTGCGAAGGGGGAGAAGGCTAATGTGTTGATAGGGCAAGGAGACGTGGTG
TTGGTGATGAAACGGAAACGGGACTCTAGCATACTTACTGACAGCCAGACAGCGACC
AAAAGAATTCGGATGGCCATCAATTAGTGTGCAATAGTTTAAAAACGACCTTGTTTC
TACT

polymerase PB1 (PB1) gene

AGCGAAAGCAGGCAAACCATTTGAATGGATGTCAATCCGACTTTACTTTTCTTAAAA
GTGCCAGCGCAAAATGCTATAAGTACTACATTCCCTTACACTGGAGATCCTCCATAC
AGCCATGGAACAGGAACAGGATACACCATGGACACAGTCAACAGAACACATCAATAC
TCAGAGAAAGGAAAGTGGACAACAAACACAGAGACCGGGGCACCCCAACTCAACCCA
ATTGATGGACCATTACCAGAGGACAACGAGCCAAGCGGATATGCACAAACGGATTGC
GTGTTGGAAGCAATGGCTTTCCTTGAAGAATCCCACCCAGGGATCTTTGAAAACCTCT
TGTCTTGAAACGATGGAAATCGTTCAGCAAACAAGAGTGGACAAATTAACCCAAGGT
CGCCAGACTTATGATTGGACATTGAATAGAAACCAACCAGCTGCGACTGCTTTGGCC
AATACTATAGAGGTCTTCAGATCGAACGGTCTAACAGCCAATGAATCGGGGAGACTA
ATAGATTTCTCTCAAGGATGTGATGGAATCAATGGATAAAGAAGAAATGGAAATAACA
ACACATTTTCAGAGAAAGAGAAGAGTAAGGGACAATATGACCAAGAAGATGGTCACA
CAAAGAACAATAGGAAAGAAGAAGCAAAGGCTGAACAAAAGGAGCTACTTGATAAGA
GCACTGACATTGAACACGATGACCAAAGATGCAGAAAGAGGCAAGTTGAAAAGGCGG
GCAATTGCAACACCCGGGATGCAGATTAGAGGATTCGTGTACTTTGTGCGAAACACTA
GCGAGGAGCATCTGTGAGAACTTGAGCAATCTGGACTCCCCGTTGGAGGGAATGAG
AAGAAGGCTAAATTGGCAAATGTTGTGAGAAAAATGATGACTAACTCACAAGATACA
GAGCTCTCCTTTACAATTACTGGAGACAACACCAAATGGAATGAAAATCAAAATCCT
CGGATGTTTTTGGCAATGATAACATACATCACAAGAAACCAACCAGAATGGTTTAGA
AATGTCTTGAGCATTGCCCCATAATGTTCTCAAATAAAATGGCGAGATTGGGGAAA



GGATACATGTTTGAAAGTAAGAGCATGAAGCTAAGGACACAAATACCGGCAGAAATG
CTTGCAAACATTGATTTGAAATACTTCAACGAATCAACGAGAAAGAAAATCGAGAAA
ATAAGACCTCTGCTGATTGACGGCACAGCCTCATTGAGTCCTGGAATGATGATGGGC
ATGTTCAATATGCTGAGCACAGTATTAGGGGTCTCAATCCTGAATCTTGGACAAAAG
AGGTACACTAAAACCACATACTGGTGGGATGGACTCCAATCCTCTGATGATTTTCGCT
CTCATAGTGAATGCACCGAATCACGAGGGGATACAAGCAGGGGTGGATAGGTTCTAT
AGGACCTGCAAATTGGTTGGGATCAACATGAGCAAAAAGAAGTCTTACATAAACCGA
ACAGGAACATTTGAATTCACAAGCTTTTTCTACCGCTATGGATTTGTAGCGAACTTT
AGTATGGAGTTACCCAGCTTTGGAGTGTCTGGAATCAATGAATCGGCTGACATGAGT
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AGGGGTGACACACAAATTCAAACGAGGAGATCATTGAGCTGAAGAAGCTGTGGGAG
CAGACCCGTTCAAAGGCAGGGCTGTTGGTATCAGATGGAGGACCGAATCTATACAAC
ATTCGGAATCTCCACATCCCAGAGGTCTGCTTGAAGTGGGAACTAATGGATGAAGAC
TACCAGGGCAGGCTGTGTAATCCTCTAAACCCGTTTGTGTCAGTCATAAGGAAATTGAG
TCCGTAAACAATGCTGTGGTAATGCCAGCTCATGGCCCAGCCAAGAGCATGGAATAT
GATGCTGTTGCGACTACACACTCATGGATTCCTAAGAGGAACCGTTCTATTCTCAAT
ACCAGCCAAAGGGGAATTCTTGAGGATGAGCAGATGTACCAGAAGTGCTGTAGTCTA
TTCGAGAAATTCTTCCCCAGTAGTTTCATACAGGAGGCCAGTTGGAATCTCCAGCATG
GTTGAGGCCATGGTGTCTAGGGCCCGAATTGATGCACGCATTGATTTGGAATCTGGA
AGGATTAAGAAAGAAGAGTTTGCTGAGATCATGAAGATCTGTTCCACCATTTGAAGAG
CTCAGACGGCAAAAATAGTGAATTTAGCTTGTCTTCATGAAAAAATGCCTTGTTTC
TACT

polymerase PA (PA) gene

AGCAAAAGCAGGTACTGATCCGAAATGGAAGACTTTGTGCGGCAATGCTTCAATCCA
ATGATCGTCGAGCTTGCGGAAAAGACAATGAAAGAATATGGGGAAAATCCAAAAATC
GAAACGAACAAATTCGCTGCAATATGCACTCACTTAGAGGTCTGTTTCATGTATTG
GATTTCCACTTTATTGATGAACGAGGCAAATCAATAATTGTAGAATCTGGCGATCCG
AATGCATTATTGAAACACCGATTTGAGATAATTGAAGGGAGAGACCGAACGATGGCT
TGGACAGTGGTAAATAGTATCTGCAACACCACAGGAGTCGATAAGCCTAAATTCCTC
CCAGATTTGTATGATTACAAGGAGAACCGATTCATTGAAATTGGAGTGACAAGGAGG
GAAGTTCACACATACTACCTAGAAAAGGCAAATAAGATAAAATCAGAGAAGACACAC
ATTCACATATTCTCATTTCACTGGGGAGGAGATGGCCACCAAAGCTGACTATACCCTT
GATGAAGAGAGCAGAGCAAGGATCAAAACCAGGTTGTTCACTATCAGGCAAGAAATG
GCCAATAGGGGTCTGTGGGATTCCTTTTCGTCAATCTGAGAGAGGCGAAGAGACAATT
GAAGAAAGGTTTGAAATCACAGGAACCATGCGCAGGCTTGCCGACCAAAGCCTCCCA
CCGAATTTCTCCAGCCTTGAAAATTTTAGAGCCTATGTGGATGGATTCAAACCGAAC



GGCTGCCTTGAGGGCAAGCTTTCTCAAATGTCAAAAGAAGTGAACGCCAGAATTGAG
CCATTTCATGAAGACAACACCACGCCCTCTCAGATTACCTGATGGTCCTCCTTGCTCT
CAGCGGTTCGAAATTCTTACTGATGGATTCCCTTAAATTGAGCATCGAAGACCCAAGC
CATGAGGGAGAAGGTATACCGCTATATGATGCAATCAAATGCATGAAGACGTTTTTT
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GCCCTGTTGAATTCATCCTGTACAGCCATGGATGACTTCCAATTGATTCCAATGATA
AGCAAGTGCAGAACCAGAAAGGAAGACGGAAGACAAATTTATATGGGTTCATTATA
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TTCTCCCTCACTGACCCGAGGCTGGAACCACACAAGTGGGAAAAGTACTGTGTTCTC
GAAATAGGAGACATGCTCCTACGAACTGCAATAGGCCAAGTATCAAGATCCATGTTT
CTTTATGTAAGAACCAATGGGACTTCCAAGATCAAGATGAAATGGGGCATGGAGATG
AGGCGATGCCTTCTTCAATCCCTCCAACAAATTGAGAGCATGATTGAGGCAGAGTCT
TCTGTCAAAGAGAAAGACATGACCAAGGAATCTTTGAAAATAAATCAGAAACGTGG
CCAATTGGGGAATCACCTAAGGGGGTGGAGGAAAGCTCTATTGGGAAGGTGTGTAGA
ACATTATTAGCAAAATCTGTATTCAACAGCCTATATGCATCTCCACAACCTTGAGGGG
TTTTTCAGCTGAGTCGAGAAAGTTACTTCTCATTGTTTCAGGCATTTAGGGACAACCTG
GAACCTGGGACCTTCGATCTTGGGGGGCTATATGAAGCAATTGAGGAGTGCCTGATT
AATGATCCCTGGGTTTTGCTTAATGCATCTTGGTTCAACTCCTTCCTTACACATGCA
CTGAAATAGTTGTGGCAATGCTACTATTTGCTATCCATACTGTCCAAAAAAGTACCT
TGTTTCTACT

hemagglutinin (HA) gene

AGCAAAAGCAGGGGTTCAATCTGTCAAATGGAGAAAATAGTGCTTCTTCTTGCACT
GATTAGCCTTGTTAAAAGTGATCAGATTTGCATTGGTTACCATGCAAACAACCTCAAC
AATGCAGGTTGACACGATAATGGAGAAAAACGTCACTGTTACACATGCCCAAGACAT
ACTGGAAGAGACACACAACGGGAAGCTCTGCGATCTTAATGGAGTGAAGCCCCTGAT
TCTAAAGGATTGTAGCGTAGCTGGGTGGCTCCTTGGAATCCAATGTGCGACGAGTT
CATCAGGGTGCCGGAATGGTCTTACATCGTGGAGAGGGCTAACCAGCCAACGACCT
CTGTTACCCAGGGACCCTCAATGACTATGAGGAACTGAAACACCTATTGAGCAGAAT
AAATCATTTTGGAGAAAACCTCTGATCATCCCCAGGAGTTCTTGGCCCAATCATGAAAC
ATCATTAGGGGTGAGCGCAGCATGTCCATACCAGGGAGCATCCTCATTTTTTCAGAAA

TGTGGTATGGCTCATCAAAAAGAACGATGCATACCCGACAATAAAGATAAGCTACAA
TAATACCAATCGGGAAGATCTTTTGATACTGTGGGGGATTTCATCATTTCCAACAATGC
AGCAGAGCAGACAAATCTCTATAAAAACCCAGACACTTATGTTTCCGTGGGGACATC
AACATTAAACCAGAGATTGGTGCCAAAAATAGCTACTAGATCCCAAGTAAACGGGCA
AAGTGGAAGAATGGATTTCTTCTGGACAATTTTAAAACCGAATGATGCAATCCATTT
TGAGAGTAATGGAAATTTTCATTGCTCCAGAATATGCATACAAAATTGTCAAGAAAGG
GGACTCAACAATTATGAAAAGTGAAATGGAGTATGGCCACTGCAACACCAAATGTCA
AACTCCAATAGGGGCGATAAACTCTAGCATGCCATTCCACAATATACACCCTCTCAC
CATCGGGGAATGCCCCAAATACGTGAAGTCAAACAAATTGGTCCTTGCGACTGGGCT
CAGAAATAATCCTCTAAGAGAAAGAAGAAGAAAAAGAGGACTATTTGGAGCTATAGC
AGGGTTTATAGAGGGAGGATGGCAGGGAATGGTAGACGGTTGGTATGGGTATCATCA
TAGCAATGAGCAGGGGAGTGGGTACGCTGCAGACAAAGAATCCACCCAAAAGGCAAT
AGATGGAGTTACCAATAAGGTCAACTCAATCATTGACAAAATGAACACTCAATTTGA
GGCCGTTGGAAGGGAATTTAATAACTTAGAAAGGAGAATAGAGAATTTAAACAAGAA
AATGGAAGACGGATTCTTAGATGTCTGGACTTATAATGCTGAACTTTTAGTTCTCAT
GGAAAATGAGAGAACTCTAGATTTCCATGACTCAAATGTCAAGAACCTTTACGACAA
AGTCCGGCTACAGCTTAGGGATAATGCAAAGGAGCTGGGTAATGGTTGTTTCGAGTT
CTATCACAAATGTGATAACGAATGTATGGAGAGCGTAAGAAATGGGACGTATGACTA
CCCTAAGTATTCAGAAGAAGCAATATTA AAAAGAGAAGAAATAAGCGGAGTGAAATT
AGAATCAATAGGAACTTACCAATATTTGTCAATTTATTCAACAGTGGCGAGTTCCCT
AGCACTGGCAATCATTGTGGCTGGTCTATCTTTATGGATGTGCTCTAATGGGTCGTT
ACAATGCAGAAATTTGCATCTAAATTTGTGAGCTCAGATTGTAATTA AAAACACCCTT
GTTTCTACT

nucleocapsid protein (NP) gene

AGCAAAAGCAGGGTAGATAATCACTCACTGAGTGACATCAACATCATGGCGTCTCAA
GGCACCAAACGATCTTATGAACAGATGGAACTGGTGGAGAACGCCAGAATGCCACT
GAAATCAGAGCATCTGTTGGAAGGATGGTTGGTGGAAATTGGGAGGTTTTACATACAG
ATGTGCACTGAGCTCAAACCTCAGCGACTATGAAGGGAGGCTGATCCAGAACAGCATA
ACAATAGAGAGAATGGTTCTTTCTGCATTTGATGAAAGGAGGAACAAATACCTGGAA
GAGCATCCCAGTGCTGGAAAGGATCCGAAGAAAACCTGGAGGTCCAATTTATCGAAGA
AGGGAAGGGAAATGGATGAGAGAGCTGATTCTGTATGACAAAGAGGAGATCAGGAGA
ATCTGGCGTCAAGCGAATAATGGAGAAGACGCAACTGCTGGTCTCACTCACCTGATG
ATCTGGCATTCCAACCTAAATGATGCCACATACCAGAGAACCAGAGCTCTTGTGCGC
ACTGGGATGGACCCCAAGATGTGCTCTCTGATGCAAGGGTCAACTCTCCCAGAGGAGA
TCTGGAGCTGCTGGAGCAGCAGTAAAGGGAGTCGGGACGATGGTGATGGAACATAATT
CGAATGATAAAAACGAGGAATTAATGATCGGAATTTCTGGAGAGGCGAAAATGGACGG
AGAACAAGGATTGCATATGAGAGGATGTGCAACATCCTCAAAGGGAAATTCCAAACA



GCAGCACAAAGAGCAATGATGGATCAAGT GCGAGAAAGCAGAAATCCTGGGAATGCT
GAAATTGAAGATCTCATCTTCCTGGCACGGTCTGCGCTCATCCTGAGAGGATCAGTG
GCCATAAGTCCTGCCTTCCTGCTTGTGTGTACGGCCTTGCTGTGGCCAGTGGGTAT
GATTTTGAGAGAGAAGGGTACTCTCTAGTTGGAATAGATCCTTTCCGTCTGCTTCAA
AACAGCCAGGTCTTCAGTCTCATTAGACCAAATGAGAACCCAGCACACAAGAGTCAA
TTGGTGTGGATGGCATGCCATTCTGCAGCATTTGAGGACCTGAGAGTCTCAAGTTTC
ATCAGAGGGACAAGAGTGGTCCCAAGAGGGCAACTATCCACTAGAGGAGTTCAAATT
GCTTCAAATGAGAACATGGAACAATGGACTCCAGCACTCTTGAAC TAAGGAGCAGA
TATTGGGCTATAAGGACCAGGAGTGGAGGAAACACCAACCAACAGAGAGCATCTGCA
GGACAGATCAGTGTACAGCCTACTTTCTCAGTACAGAGAAGTCTTCCCTTCGAAAGG
GCAACCATTATGGCGGCATTACAGGAAATACTGAAGGCAGAACATCTGACATGAGG
ACTGAAATCATAAGAATGATGGAAAGTGCCAGACCAGAAGATGTGTCCTTTCAGGGG
CGGGGAGTCTTCGAGCTCTCGGACGAAAAGGCAACGAACCCGATCGTGCCTTCCTTT
GACATGAGTAATGAAGGATCTTATTTCTTCGGAGACAATGCAGAGGAGTATGACAAT
TAAAGAAAAATACCCTTGTTTCTACT

neuraminidase (NA) gene

AGCAAAAGCAGGAGTTTAAATGAATCCAAATCAGAAAATAGTAACCATTGGCTCCA
TTTCATTAGGGTTGGTTGTATTCAATGTTCTACTGCATGCCGTGAGCATCATATTAA
CAGTGTTAGCCCTGGGGAAGAGTGAAAACAATGGAATCTGCAATGGAAGTGTAGTGA
GGGAACACAATGAAACAGTTAGAATAGAGAAAGTGACTCAATGGTACAATACTAGCG
TAGTCGAATATGTACCGCATTGGAATGAGGGAACTTATATAAACAACACCGAACCAA
TATGTGATGTCAAGGGTTTTGCACCTTTTTTCCAAGGACAACGGGGTGAGAGTTGGCT
CCAGGGGGCATATTTTTGTCTATAAGAGAGCCTTTTCGTCTCTTGTTTACCAGTAGGGT
GCAGGACTTTCTTCCTCACTCAGGGATCTCTACTCAATGACAAACACTCAAATGGAA
CAGTGAAGGATAGAAGCCCATTCAGAACTCTCATGAGTGTGCAAGTGGGCCAATCAC
CCAATGTATATCAAGCCAGGTTTGAAGCTGTGGCATGGTCAGCAACAGCCTGTCATG
ATGGTAAGAAGTGGATGGCAATTGGTGTAAACAGGGCCAGATTCTAAAGCAGTAGCAG
TAGTTCATTACGGAGGGGTGCCTACTGACGTTGTTAACTCCTGGGCAGGAGATATAT
TAAGAACTCAGGAGTCATCTTGTACTTGCAATTCAGGCAATTGTTATTGGGTAATGA
CTGACGGTCCTGCCAATAGACAGGCGCAGTATAGAATATACAAAGCAAACCAAGGCA
AAATAATTGGCCGAAAAGATGTTAGCTTTAGTGGAGGACATATTGAGGAATGTTCTT
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ACAGACCTGTGCTAATTATTTGCCTGATCTCTCTTACAGAGTTGGGTATTTATGTG
CAGGGTTGCCAGTGACACTCCAAGAGGGGAGGATACTCAATTTGTGCGTTTCATGCA
CTAGTCCCATGGGAAATCAGGGGTATGGCGTAAAAGGGTTCGGGTTCGACAGGGAA
CTGATGTGTGGTGGGGCGGACAATTAGTCGAACCTCCAGATCAGGATTTGAAATAA
TAAGGATAAAGAATGGTTGGACGCAAACAAGCAAAGAACAGATTAGAAGACAGGTGG

TTGTTGATAACTCGAATTGGTCGGGATACAGTGGGTCTTTCACCTTTACCAGCAGAAT
TGACTGGGAGGGAATGTTTGGTTCCCTGTTTTTGGGTCGAAATGATCAGAGGTAGGC
CAGAAGAGAGAACAATCTGGACCTCTAGTAGCTCCATTGTAATGTGTGGAGTTGATT
ATGAAATTGCCGACTGGTCATGGCACGATGGAGCTATTCTTCCCTTTGACATCGATA
AGATGTAATTTACGAAAAAACTCCTTGTTTCTACT

matrix protein 2 (M2) and matrix protein 1 (M1) genes

AGCAAAAGCAGGTAGATATTGAAAGATGAGTCTTCTAACCGAGGTCGAAACGTACGT
TCTCTCTATCATCCCGTCAGGCCCCCTCAAAGCCGAGATCGCGCAGAGACTTGAAGA
TGTCTTTGCAGGGAAAAACACCGATCTCGAGGCTCTCATGGAGTGGCTAAAGACAAG
ACCAATCCTGTCACCTCTGACTAAAGGGATTTTGGGATTTGTGTTACGCTCACCGT
GCCCAGTGAGCGAGGACTGCAGCGTAGACGCTTCGTCCAGAATGCCCTAAATGGAAA
TGGGGATCCAAATAATATGGATAAGGCAGTTAAGCTATATAAGAAGCTGAAAAGAGA
GATAACATTCCATGGGGCTAAGGAGGTCGCACTTAGCTACTCAACCGGTGCACTTGC
CAGCTGCATGGGTCTCATATACAACAGGATGGGAACGGTGACTACAGAAGTGGCTTT
TGGCCTAGTGTGTGCCACTTGTGAGCAGATTGCAGATTACAGCATCGGTCCACAG
ACAGATGGCAACCATCACCAACCCATTAATCAGACATGAGAACAGAATGGTGCTGGC
CAGCACTACAGCTAAGGCCATGGAGCAGATGGCAGGATCAAGCGAGCAGGCATCAGA
AGCCATGGAGGTTGCTAATCAGGCCAGGCAGATGGTACAGGCAATGAGGACAATTGG
GACTCATCCTAATTCTAGTGCTGGTCTGAGAGATAATCTTCTTGAAAATTTGCAGGC
CTACCAGAACCGAATGGGAGTGCAGATGCAGCGATTCAAGTGATCCTCTTGTTGTTG
CCGCAAATATCATTGGGATCCTGCACTTGATATTGTGGATCCTTGATCGTCTTTTCT
TCAAATGCATTTATCGTCGCCTTAAATACGGTTTGAAAATAGGGCCTTCTACGGAAG
GGGTACCTGAGTCTATGAGGGAAGAGTACCGGCAGGAACAGCAGAGTGCTGTGGATG
TTGACGATGGTCATTTTGTCAACATAGAATTGGAGTAAAAAACTACCTTGTTTCTAC
T

nuclear export protein (NEP) and nonstructural protein 1 (NS1) genes

AGCAAAAGCAGGGTGACAAAAACATAATGGATTCCAACACTGTGTCAAGCTTTCAGG
TAGACTGCTTTCTTTGGCATGTCCGCAAACGATTTGCAGACCAAGAACTGGGTGATG
CCCCATTCTTGACCGGCTTCGCCGAGATCAGAAGTCTCTAAGAGGAAGAGGCAGCA
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CAAGCCTTACAACCTATTGCTTGAAGTGGAGCAAGAGATAAGAAGCTTTCTCGTTTCAG
CTTATTTAATGATAAAAAACACCCTTGTTTCTACT