Figure S1: Sequence alignment of HA1 of the viruses used in this study

|                | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 |
|----------------|----|----|----|----|----|----|----|----|----|-----|-----|
| A/Albany/11/1968 | QDLPGN         | ATLCLGH        | AVN           | Y       | KI  | G   | H  | D  |
| A/BCH/2/1968     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/Albany/1/1969 | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/2/1969     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/Albany/1/1970 | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/1/1972     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/1/1973     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/1/1974     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/Albany/42/1975 | .N.            | .N.            | .N.           | .N.     | .   | .   | .  |  
| A/BCH/3/1975     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/1/1976     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/11/1976    | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/3/1977     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/1/1978     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/1/1980     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/1/1981     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/1/1982     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/Memphis/33/1983 | .K.         | .K.            | .K.           | .K.     | .   | .   | .  |  
| A/Memphis/2/85   | .K.            | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Memphis/2/1986 | .K.            | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Memphis/3/88   | .K.            | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Memphis/7/90   | .K.            | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/BCH/1/1991     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/2/1992     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/BCH/1/1993     | . . .         | . . .         | . . .         | . . .   | .   | .   | .  |  
| A/Memphis/7/94   | .K.            | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/New York/696/1994 | .K.       | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Memphis/8/95   | .K.            | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Memphis/9/1996 | .K.            | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Memphis/3003/96 | .K.         | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Oklahoma/5096/96 | .K.       | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Memphis/5/97   | .K.            | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Memphis/14/1998 | .K.         | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Memphis/49/1999 | .K.         | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/BCH/1/2001     | .K.            | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/BCH/1/2002     | .K.            | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Memphis/27/2003 | .K.         | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Oklahoma/323/03 | .K.         | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Oklahoma/1992/05 | .K.        | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Oklahoma/309/06 | .K.         | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Oklahoma/483/08 | .KF.        | .KF.          | .KF.          | .KF.    | .   | .   | .  |  
| A/Oklahoma/534/10 | .K.         | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Oklahoma/5386/10 | .K.        | .K.           | .K.           | .K.     | .   | .   | .  |  
| A/Oklahoma/2280/12 | .KI.       | .KI.          | .KI.          | .KI.    | .   | .   | .  |  

**Note:** The alignment shows the sequence differences among the HA1 of the viruses used in the study.
| Location   | Date/Year | Sequence |
|------------|-----------|----------|
| Albany     | 11/1968   | LVASSGTLEF |
| NYC        | 12/1969   | ITEGFTWTVG |
| Texas      | 1/1970    | TQNGSSNACK |
| Oklahoma   | 3/1975    | RGPSSGFFSR |
| Memphis    | 4/1976    | LNWLTKSGST |
| Oklahoma   | 5/1976    | YPVLNVTMPN |
| Memphis    | 6/1976    | NDNFKLYIW  |
| New York   | 7/1976    | GVPHTNQTE |
| Oklahoma   | 8/1976    | QTSLYQASC |
| Memphis    | 9/1976    | RVTVSTRSQ |
| Oklahoma   | 10/1976   | QTIIPNIGSR |
| Oklahoma   | 1/1978    | A/Oklahoma/42/1975 |
| New York   | 2/1978    | N.Oklahoma/5386/ |
| Memphis    | 3/1978    | A/Oklahoma/5342/ |
| New York   | 4/1978    | A/Oklahoma/483/08 |
| Oklahoma   | 5/1978    | A/Oklahoma/1992/05 |
| New York   | 6/1978    | A/Oklahoma/2800/12 |
| Memphis    | 7/1978    | A/Memphis/49/99 |
| New York   | 8/1978    | A/Memphis/27/2003 |
| Oklahoma   | 9/1978    | A/Memphis/9/1996 |
| New York   | 10/1978   | A/Memphis/3003/96 |
| Memphis    | 11/1978   | A/New York/696/1994 |
| New York   | 12/1978   | A/New York/696/1994 |
| Oklahoma   | 1/1979    | A/Memphis/27/2003 |
| Oklahoma   | 2/1979    | A/Memphis/9/1996 |
| Oklahoma   | 3/1979    | A/Memphis/27/2003 |
| Oklahoma   | 4/1979    | A/Memphis/9/1996 |
| New York   | 5/1979    | A/Memphis/27/2003 |
| Oklahoma   | 6/1979    | A/Memphis/9/1996 |
| New York   | 7/1979    | A/Memphis/27/2003 |
| Oklahoma   | 8/1979    | A/Memphis/9/1996 |
| New York   | 9/1979    | A/Memphis/27/2003 |
| Oklahoma   | 10/1979   | A/Memphis/9/1996 |
| New York   | 11/1979   | A/Memphis/27/2003 |
| Oklahoma   | 12/1979   | A/Memphis/9/1996 |
| New York   | 1/1980    | A/Memphis/27/2003 |
| Oklahoma   | 2/1980    | A/Memphis/9/1996 |
| New York   | 3/1980    | A/Memphis/27/2003 |
| Oklahoma   | 4/1980    | A/Memphis/9/1996 |
| New York   | 5/1980    | A/Memphis/27/2003 |
| Oklahoma   | 6/1980    | A/Memphis/9/1996 |
| New York   | 7/1980    | A/Memphis/27/2003 |
| Oklahoma   | 8/1980    | A/Memphis/9/1996 |
| New York   | 9/1980    | A/Memphis/27/2003 |
| Oklahoma   | 10/1980   | A/Memphis/9/1996 |
| New York   | 11/1980   | A/Memphis/27/2003 |
| Oklahoma   | 12/1980   | A/Memphis/9/1996 |
|                  | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 |
|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| A/Albany/11/1968|     |     |     |     |     |     |     |     |     |     |     |
| A/Albany/1/1969 |     |     |     |     |     |     |     |     |     |     |     |
| A/Oklahoma/5386 |     |     |     |     |     |     |     |     |     |     |     |
| A/Oklahoma/5386 |     |     |     |     |     |     |     |     |     |     |     |
| A/Oklahoma/323/03|     |     |     |     | .R..DI.... | ... |     |     |     |     |     |
| A/Memphis/27/2003| .R..DV.... |     |     |     |     |     |     |     |     |     |     |
| A/BCM/1/2002    |     |     |     |     |     |     |     |     |     |     |     |
| A/Memphis/49/99 |     |     |     |     |     |     |     |     |     | .I.L. |     |
| A/Memphis/5/97  |     |     |     |     |     |     |     |     |     | .I.L. |     |
| A/Oklahoma/5098/96|     |     |     |     |     |     |     | .I.L. |     |     |     |
| A/New York/696/1994|          |          |          |          |          |          |          |          |          |          |          |
| A/Memphis/3/88  |     |     |     |     | .I.L. | .V |     |     |     |     | .I.L. |
| A/Oklahoma/3/1974|     |     |     |     |     |     |     |     |     |     |     |
| A/BCM/1/1975    |     |     |     |     | .V |     |     |     |     | .I.L. |     |
| A/BCM/3/1975    |     |     |     |     | .V |     |     |     | .I.L. |     |     |
| A/BCM/1/1976    |     |     |     | .I.L. | .V |     |     |     |     | .I.L. |     |
| A/BCM/11/1976   |     |     |     | .I.L. | .V |     |     |     | .I.L. |     |     |
| A/BCM/3/1977    |     |     |     | .I.L. | .I |     |     |     | .I.L. |     |     |
| A/Ben/1/1978    |     |     |     | .I.L. | .I | .G.S. | .I.L. |     | .I.L. |     |     |
| A/BCM/1/1980    |     |     |     | .I.L. | .I |     | .G.S. | .I.L. |     | .I.L. |     |
| A/BCM/1/1981    |     | .I.L. | .I | .G.S. |     |     |     |     |     |     |     |
| A/BCM/1/1982    |     | .I.L. | .I | .G.S. |     |     |     |     |     |     |     |
| A/Memphis/33/83 |     | .I.L. | .T | .I |     | .G.S. |     |     |     |     |     |
| A/Memphis/2/85  |     | .I.L. | .T | .I |     | .G.S. |     |     |     |     |     |
| A/Memphis/2/1986|     | .I.L. | .T | .I | .G.S. |     |     |     |     |     |     |
| A/Memphis/3/88  |     | .I.L. | .T | .I | .G.S. |     |     |     |     |     |     |
| A/Memphis/7/90  |     | .I.L. | .T | .I | .G.S. | .R | .R | .R |     |     |     |
| A/Ben/1/1991    |     | .I.L. | .T | .I | .G.S. | .R | .R | .R |     |     |     |
| A/Ben/3/1992    |     | .I.L. | .T | .I | .G.S. | .R | .R | .R |     |     |     |
| A/Ben/3/1993    |     | .I.L. | .T | .I | .G.S. | .R | .R | .R |     | .R | .R |
| A/Memphis/7/94  |     | .I.L. | .T | .I | .G.S. | .R | .R | .R |     | .R | .R |
| A/New York/696/1994| .I.L. | .T | .I | .G.S. | .R | .R | .R | .R | .R |     |     |
| A/Memphis/9/95  |     | .I.L. | .T | .I | .G.S. | .R | .R | .R | .R | .R | .R |
| A/Memphis/9/1996|     | .I.L. | .T | .I | .G.S. | .R | .R | .R | .R | .R | .R |
| A/Oklahoma/3003/96| .I | .I.L. |.T | .I | .N | .N.N. | .R | .R | .R | .R | .R |
| A/Oklahoma/5098/96| .V | .I.L. | .T | .I | .S | .V | .N.N. | .R | .R | .R | .R |
| A/Memphis/5/97  |     | .V | .I.L. | .T | .I | .R | .N.N. | .R | .R | .R | .R |
| A/Memphis/14/1998| .V | .I.L. | .T | .I | .S | .G.K.N. | .R | .R | .R | .R | .R |
| A/Memphis/49/99 |     | .V | .I.L. | .T | .I | .S | .N | .G.K.N. | .R | .R | .R |
| A/Ben/1/2001    |     | .V | .I.L. | .T | .I | .S | .G.K.N. | .R | .R | .R | .R |
| A/BCM/1/2002    | .G.V. | .I.L. | .T | .I | .S | .G.K.N. | .R | .R | .R | .R | .R |
| A/Memphis/27/2003| .R.DV | .I.L. | .T | .I | .S | .G.K.N. | .R | .R | .R | .R | .R |
| A/Oklahoma/323/03| .R.DI | .I.L. | .T | .I | .S | .G.K.N. | .R | .R | .R | .R | .R |
| A/Oklahoma/1992/05| .R.DIP | .I.L. | .T | .I | .S | .G.K.N. | .R | .R | .R | .R | .R |
| A/Oklahoma/309/06| .R.NIP | .I.L. | .T | .I | .S | .G.K.N. | .R | .R | .R | .R | .R |
| A/Oklahoma/483/08| .R.DIP | .I.L. | .T | .I | .S | .G.K.N. | .R | .R | .R | .R | .R |
| A/Oklahoma/5342/10| .R.DIP.V | .I.L. | .T | .I | .S | .G.K.N.A | .R | .R | .R | .R | .R |
| A/Oklahoma/5386/10| .R.DIP.V | .I.L. | .T | .I | .S | .G.K.N.A | .R | .R | .R | .R | .R |
| A/Oklahoma/2280/12| .R.NIP.V | .I.L. | .T | .I | .S | .G.K.N.A | .R | .R | .R | .R | .R |

Generated by the Influenza Sequence Database
Macken, C., Lu, H., Goodman, J., & Boykin, L., "The value of a database in surveillance and vaccine selection." in Options for the Control of Influenza IV. A.D.M.E. Osterhaus, N. Cox & A.W. Hampson (Eds.) Amsterdam: Elsevier Science, 2001, 103-106.
A dot indicates the amino acid is the same as on the top line. Sequons for N-linked glycosylation are highlighted in yellow.