



INFORMATION FOR THE VACCINES AND RELATED BIOLOGICAL
PRODUCTS ADVISORY COMMITTEE

March 6, 2002

Bethesda, Maryland

WHO COLLABORATING CENTER FOR SURVEILLANCE,
EPIDEMIOLOGY AND CONTROL OF INFLUENZA

Influenza Branch
Division of Viral and Rickettsial Diseases
National Center for Infectious Diseases
Centers for Disease Control and Prevention
Atlanta, GA 30333

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US Surveillance

Summary of Influenza Surveillance, United States September 30, 2001 - February 16, 2002*

Influenza activity in the United States overall has been moderate but may still be increasing. The percentage of specimens testing positive for influenza increased from 4% at the end of November to 23% for the week ending February 2, 2002. Since that time, the percentage of specimens testing positive for influenza has decreased to 21%; however, this decrease may be due to incomplete reporting rather than a true decrease in influenza activity. The predominant viruses isolated this season have been influenza type A (H3N2) viruses. The percentage of deaths attributed to pneumonia and influenza (P&I) has not exceeded epidemic threshold levels this season. The percentage of visits to U.S. sentinel physicians for influenza-like illness (ILI) has exceeded the national baseline of 1.9% for 7 of the last 8 weeks.

WHO and NREVSS collaborating laboratories

Since September 30, WHO and NREVSS laboratories have tested a total of 47,974 specimens for influenza viruses and 5,574 (11.6%) were positive. Of the 5,574 isolates identified, 5,506 (99%) were influenza A viruses and 68 (1%) were influenza B viruses. One thousand seven hundred and fifty-six (32%) of the 5,506 influenza A viruses identified have been subtyped; 1,739 (99%) were H3 viruses and 17 (1%) were H1 viruses. Laboratory-confirmed influenza has been reported by all 50 states. Influenza isolates have been identified each week of this season but the proportion of specimens testing positive for influenza increased steadily from 4% at the end of November to 23% at the end of January. The percentage of specimens testing positive for influenza has declined to 21% during the week ending February 16. This decline may reflect incomplete reporting rather than a true decline in influenza activity and until data become available it will not be possible to determine if influenza activity has peaked.

P&I deaths from 122 cities

The percentage of deaths attributed to pneumonia and influenza (P&I) has remained below the epidemic threshold for each week since September 30. During the week ending February 16, 8.2% of deaths were due to pneumonia or influenza. This was below the epidemic threshold of 8.3% for that week.

Sentinel physicians network

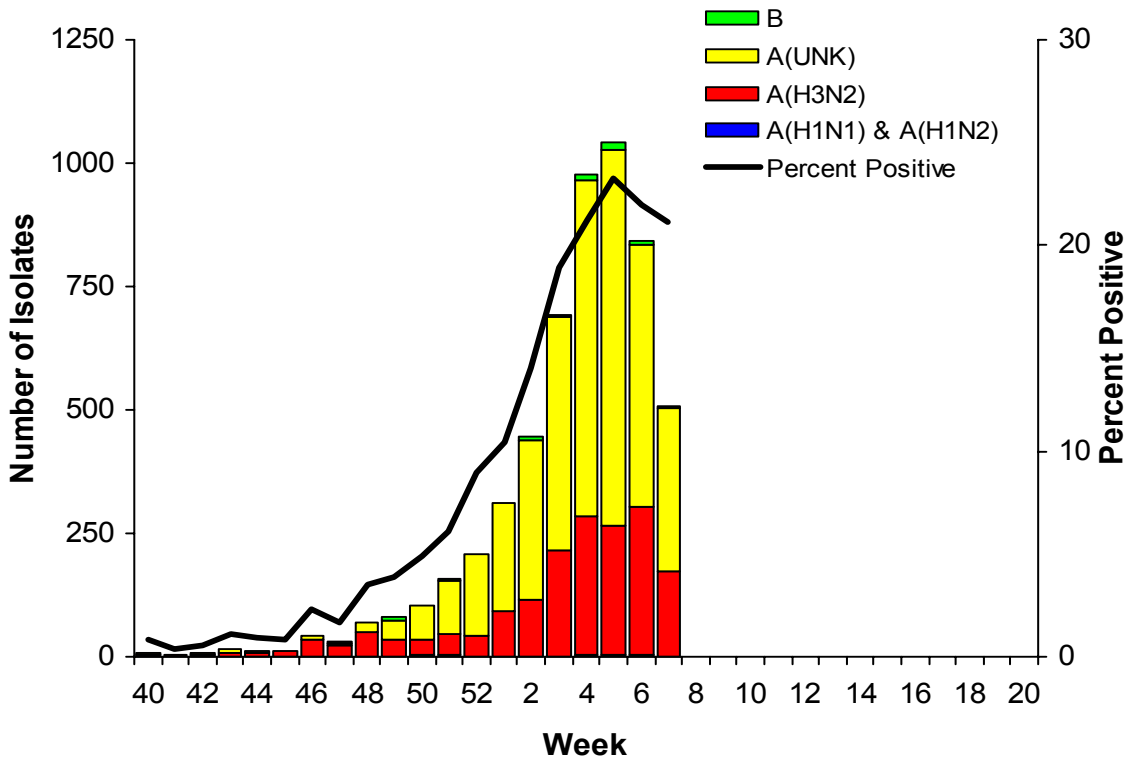
Nationwide, the percentage of visits to U.S. sentinel physicians for influenza-like illness (ILI) has exceeded the national baseline of 1.9% for 7 of the last 8 weeks. For the week ending February 16, the overall percentage of patient visits to sentinel physicians for ILI was 3.6%.

State and territorial epidemiologists

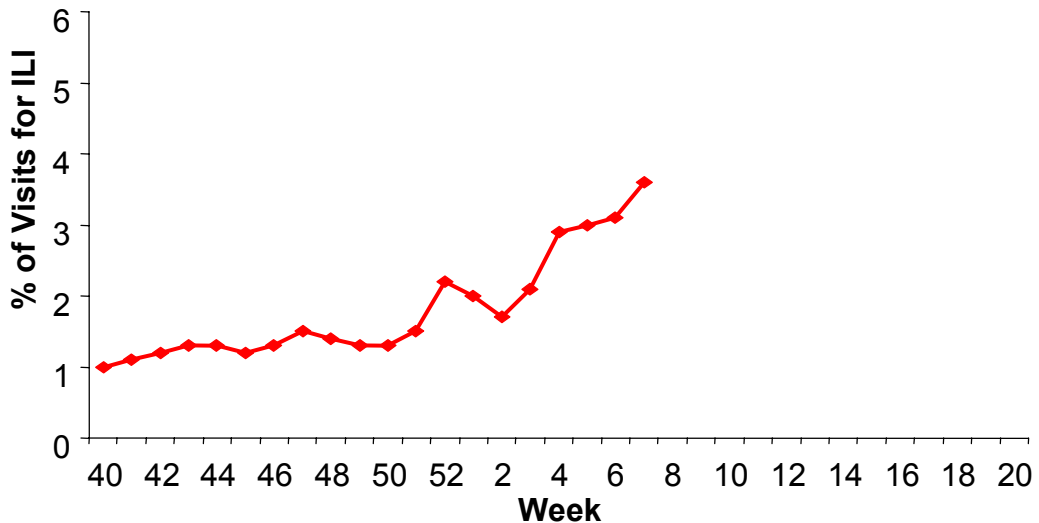
Regional or widespread influenza activity has been reported by at least one state each week since the week ending November 17, 2001. Widespread activity was first reported the week ending December 1, 2001. For the week ending February 16, with 48 states reporting, 13 states reported widespread activity, 22 states reported regional activity, 12 states reported sporadic activity, and one state reported no influenza activity.

* Data reported as of February 21, 2002.

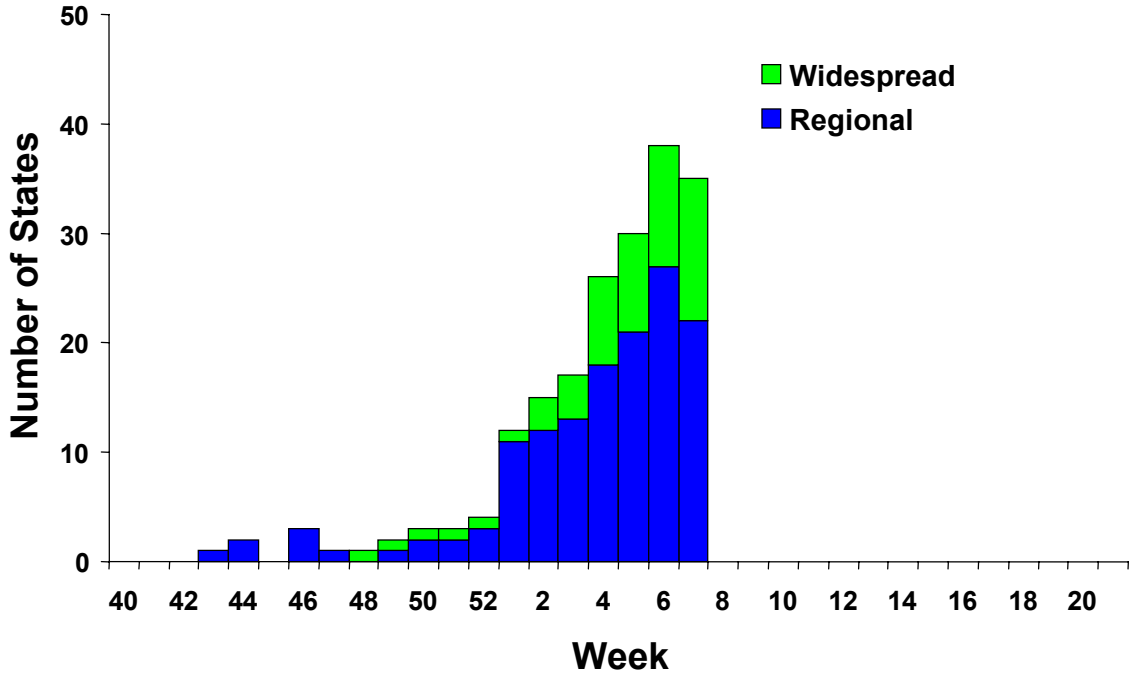
WHO/NREVSS Collaborating Laboratories National Summary, 2001-2002



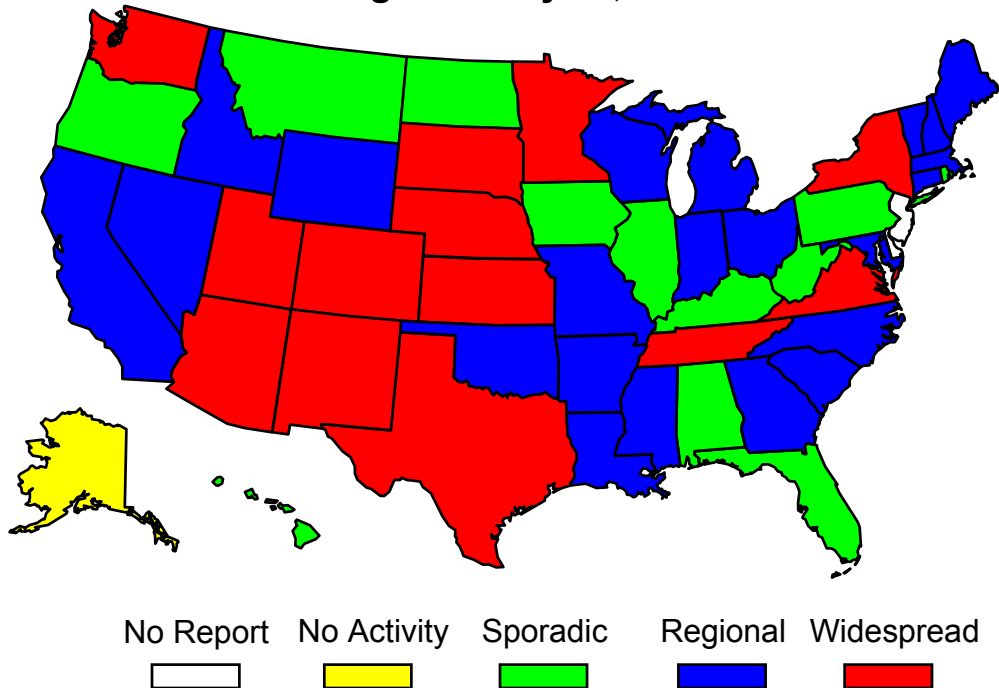
Percentage of Visits for Influenza-like Illness Reported by Sentinel Physicians National Summary, 2001-2002



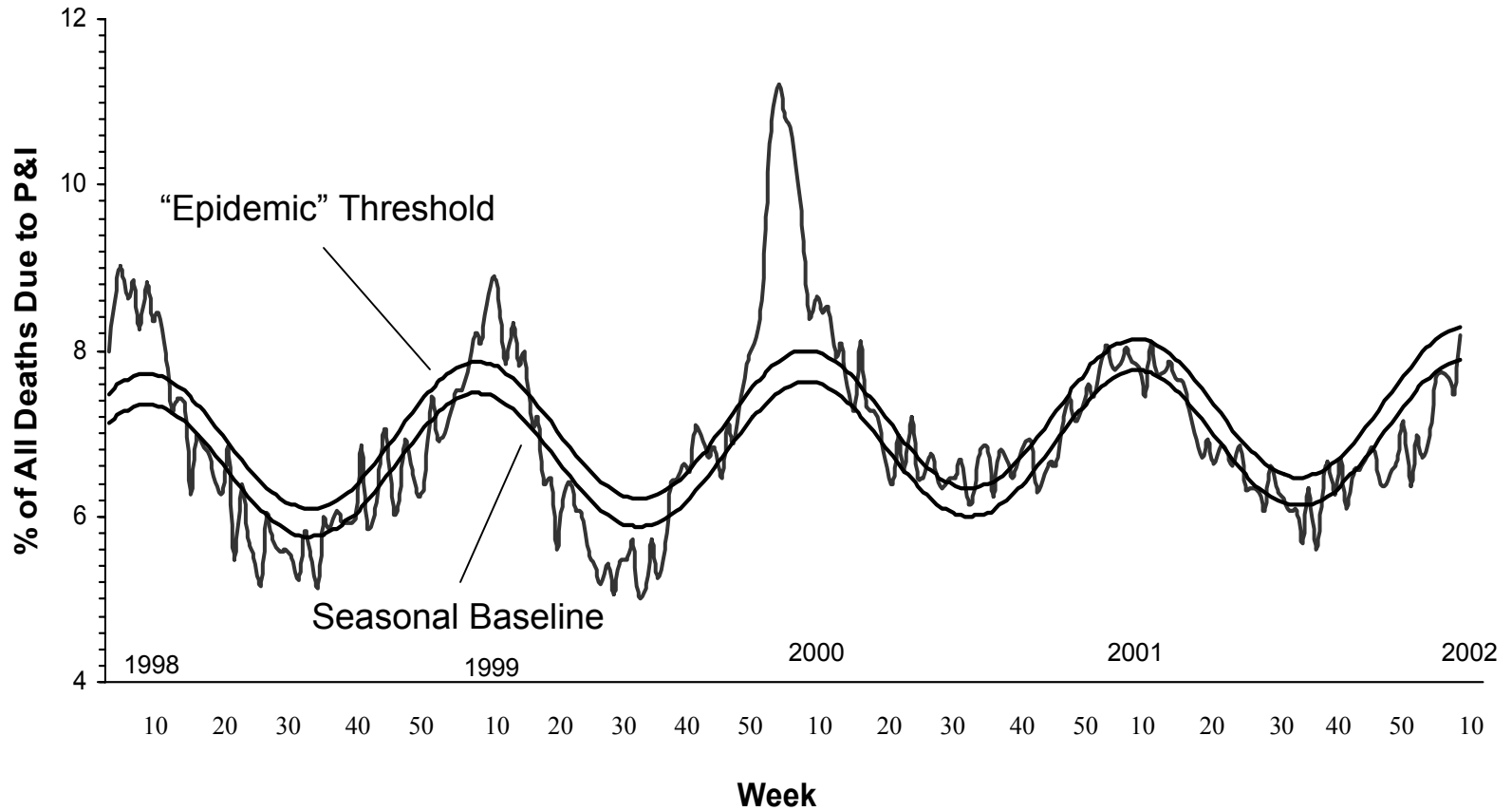
Weekly Assessment of Influenza Activity by State and Territorial Epidemiologists 2001-2002 Season



Weekly Influenza Activity Estimates Reported by State & Territorial Epidemiologists Week ending February 16, 2002 - Week 7



Pneumonia and Influenza Mortality for 122 U.S. Cities Week Ending 2/16/02



Influenza A(H1N1) and A(H1N2) Viruses

HEMAGGLUTINATION INHIBITION REACTIONS OF INFLUENZA H1 VIRUSES (02/07/02)

STRAIN DESIGNATION		REFERENCE FERRET ANTISERA					Date collected	Passage
		A BJ/262	B NC/20	C FUJ/156	D HI/15	E JOH/82		
REFERENCE ANTIGENS								
1.	A/BEIJING/262/95	640	640	640	80	80	01/09/95	E3/E3
2.	A/NEW CALEDONIA/20/99*	160	640	1280	160	40	06/09/99	E4/E1
3.	A/FUJIAN/156/2000	80	320	1280	80	20	08/25/00	E2/E2
4.	A/HAWAII/15/2001*	40	40	20	320	5	02/17/01	M2/C2
5.	A/JOHANNESBURG/82/96	40	40	20	40	2560	1996	E4/E3
TEST ANTIGENS								
6.	A/TEXAS/19/2001	320	1280	2560	320	80	12/14/01	M1/C1
7.	A/CANADA/03/2002	160	640	320	160	40	01/02/02	X2/C1
8.	A/CANADA/04/2002	160	320	160	40	10	12/12/01	X2/C1
9.	A/ARGENTINA/447/2001	80	320	640	80	10	09/03/01	C2/C1
10.	A/EGYPT/21181/2001	160	640	320	40	20	11/28/01	C2/C1
11.	A/EGYPT/21133/2001	160	320	320	40	5	11/18/01	C2/C1
12.	A/EGYPT/21138/2001	160	320	320	40	5	11/18/01	C2/C1
13.	A/INDIA/77267/2001	320	1280	640	80	20	10/24/01	CX
14.	A/INDIA/77308/2001	160	640	320	40	20	10/01/01	CX
15.	A/PHILIPPINES/92946/2001	320	640	1280	160	40	10/12/01	CX
16.	A/PHILIPPINES/4914/2001	160	320	1280	160	20	10/22/01	CX
17.	A/THAILAND/5965/2001	320	1280	2560	320	80	10/25/01	CX
18.	A/THAILAND/78216/2001	320	640	1280	160	40	10/28/01	CX
19.	A/THAILAND/6010/2001	160	640	640	160	20	10/30/01	CX
20.	A/MALAYSIA/6941/2001	320	640	1280	160	40	11/05/01	CX
21.	A/MALAYSIA/6926/2001	320	640	1280	160	40	11/08/01	CX
22.	A/SINGAPORE/73/2001	160	640	320	40	10	11/23/01	X/C1
23.	A/SINGAPORE/66/2001	80	320	160	40	10	11/01/01	X/C1
24.	A/SINGAPORE/68/2001	160	320	320	80	10	11/06/01	X/C1
25.	A/BRISBANE/166/2001	40	160	160	40	10	10/04/01	CX/C1
26.	A/WUHAN/383/2001	320	640	1280	160	40	11/22/01	C2/C1
27.	A/BEIJING/158/2001	160	320	640	160	20	11/30/01	C1/C2
28.	A/WUHAN/381/2001	160	320	1280	160	20	11/22/01	C2/C1
29.	A/FUJIAN/626/2001	40	160	640	40	10	11/28/01	E2/E1

* Serology antigen

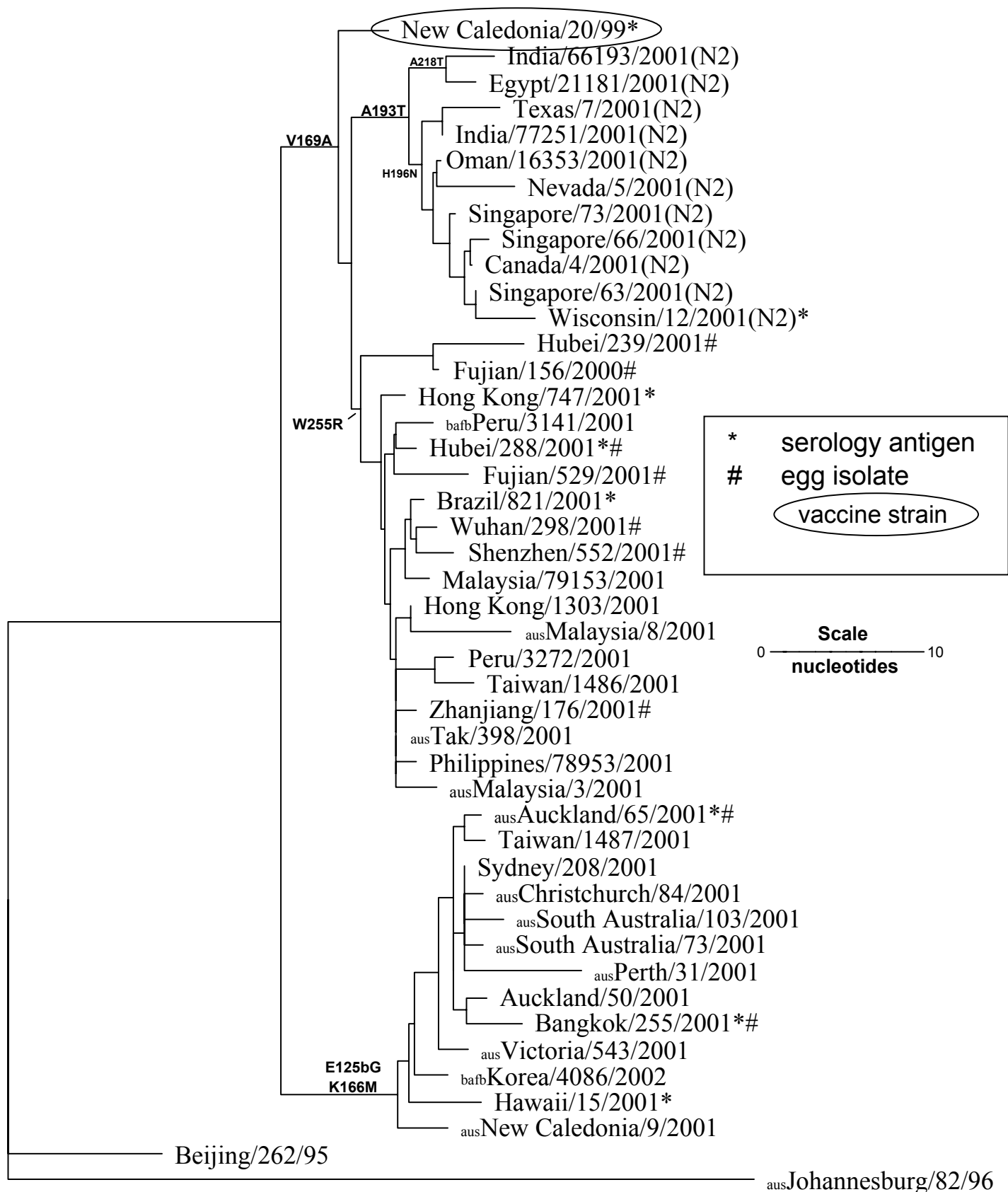
Influenza A(H1N1) and A(H1N2) Isolates Characterized by CDC

	U.S.A.	North America	Europe	Asia	Cent/So America	Africa, Australia, New Zealand	Total (%)
October 2000 - March 2001							
A/N.Caledonia/20/99-like	342	5	83	91	1	8	530 (95%)
A/N.Caledon./20/99-like (low)	5			5			10 (1%)
A/Johannesburg/82/96-like	18	1	1		1		21 (4%)
						Total	561
April 2001 - September 2001							
A/N.Caledonia/20/99-like	3	1	1	135	14	13	167 (92%)
A/N.Caledon./20/99-like (low)				13	1		14 (8%)
A/Johannesburg/82/96-like							0
						Total	181
October 2001 - January 2002							
A/N.Caledonia/20/99-like	4	2		32		5	43 (86%)
A/N.Caledon./20/99-like (low)				6		1	7 (14%)
A/Johannesburg/82/96-like							0
						Total	50
Total	372	9	85	282	17	27	792

Preliminary Data

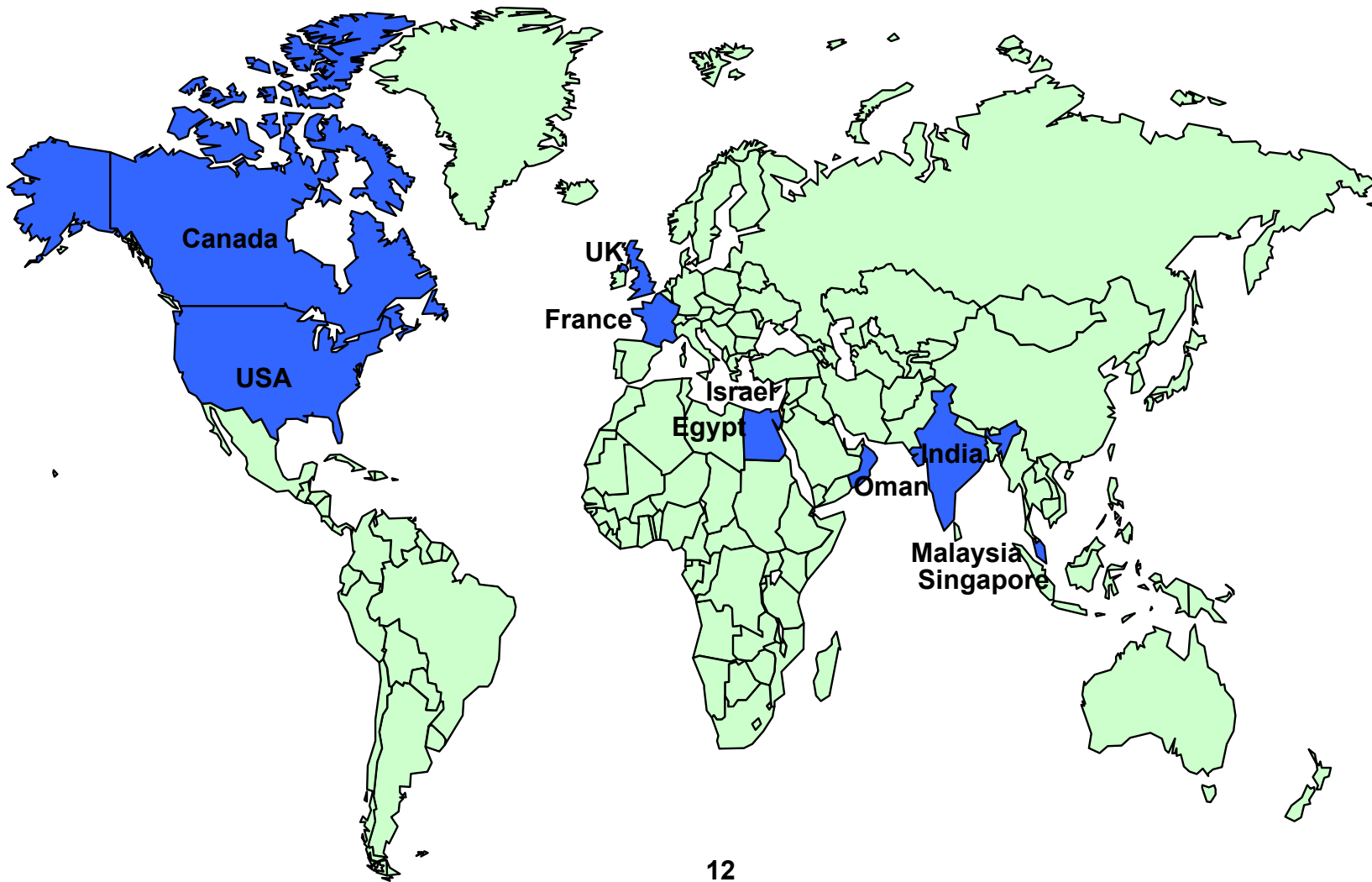
02/22/2002

Evolutionary Relationships Among Influenza H1 Hemagglutinin (HA1) Genes

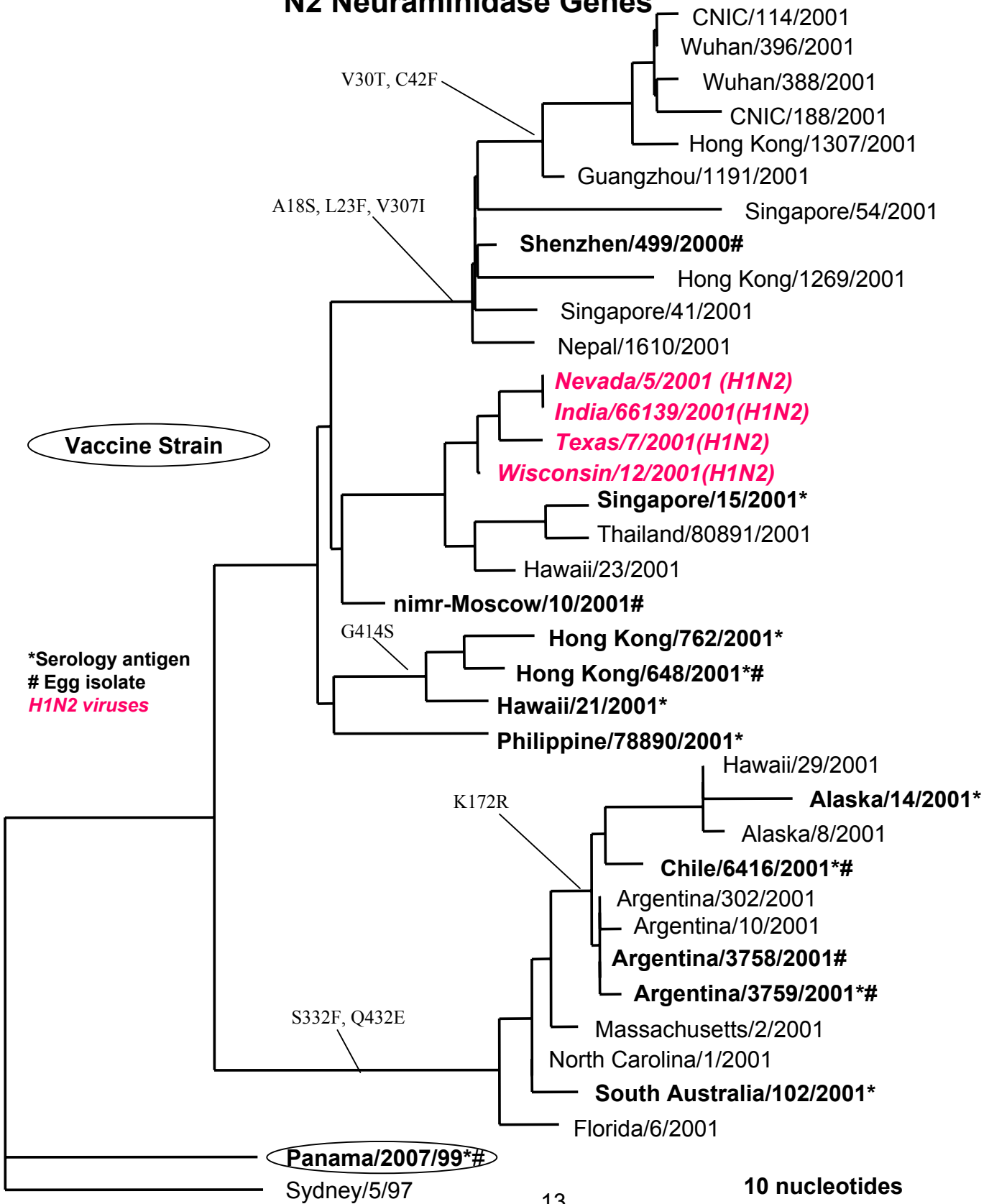


Geographic Distribution of Influenza A(H1N2) Viruses

April 2001 to Present



Evolutionary Relationships Among Influenza A N2 Neuraminidase Genes



Influenza A(H3N2) Viruses

HEMAGGLUTINATION INHIBITION REACTIONS OF INFLUENZA H3 VIRUSES (01/31/02)

STRAIN DESIGNATION	REFERENCE FERRET ANTISERA						Dare collected
	A SYD/5	B MOS/10	C PN/2007	D FUJ/140	E CHI/6416	F DAR/3	
1. A/SYDNEY/05/97	<u>640</u>	1280	320	320	160	160	06/23/97
2. A/MOSCOW/10/99	640	<u>2560</u>	320	160	320	80	01/15/99
3. A/PANAMA/2007/99*	320	1280	<u>640</u>	320	320	160	07/12/99
4. A/FUJIAN/140/2000	160	320	320	<u>640</u>	80	320	07/30/00
5. A/CHILE/6416/2001*	320	640	320	160	<u>320</u>	160	06/14/01
6. A/DARWIN/03/2001	80	40	40	80	20	<u>160</u>	09/07/00
TEST ANTIGENS							
7. A/WEST VIRGINIA/06/2001	1280	2560	1280	640	1280	320	11/29/01
8. A/TEXAS/01/2002	1280	2560	1280	640	1280	320	01/08/02
9. A/OKLAHOMA/02/2002	1280	2560	1280	640	1280	320	01/04/02
10. A/COLORADO/12/2001	320	2560	640	1280	1280	320	12/28/01
11. A/UTAH/06/2002	1280	2560	640	640	1280	320	01/05/02
12. A/LOUISIANA/01/2002	1280	2560	1280	640	2560	640	01/01/02
13. A/IDAHO/02/2001	1280	2560	1280	640	1280	320	12/13/01
14. A/WYOMING/01/2002	640	1280	640	160	640	160	01/07/02
15. A/NORTH CAROL./01/2002	640	1280	640	320	640	160	01/10/02
16. A/IOWA/05/2001	640	2560	640	640	640	320	12/21/01
17. A/RHODE ISLAND/01/2002	320	1280	320	160	320	160	01/07/02
18. A/BEIJING/159/2001	640	1280	640	320	640	320	11/30/01
19. A/BEIJING/144/2001	1280	2560	640	320	640	320	11/30/01
20. A/GUANGZHOU/1145/2001	1280	5120	1280	1280	2560	1280	UNKN
21. A/GUANGZHOU/1191/2001	1280	5120	1280	1280	2560	640	09/20/01
22. A/CNIC/188/2001	640	1280	640	320	640	160	12/13/01
23. A/WUHAN/396/2001	640	1280	320	640	320	320	11/29/01
24. A/CNIC/114/2001	160	320	160	80	80	80	12/13/01
25. A/SINGAPORE/41/2001	320	640	160	320	160	160	07/03/01
26. A/SINGAPORE/45/2001	320	640	160	320	160	160	07/19/01
27. A/SINGAPORE/69/2001	160	320	160	320	80	80	11/09/01

* Serology antigen

HEMAGGLUTINATION INHIBITION REACTIONS OF INFLUENZA H3 VIRUSES (02/20/02)

STRAIN DESIGNATION	REFERENCE FERRET ANTISERA						Date collected	Passage
	A	B	C	D	E	F		
REFERENCE ANTIGENS	SYD/5	MOS/10	PN/2007	FUJ/140	CHI/6416	CNIC/114		
1. A/SYDNEY/05/97	640	640	160	160	160	160	06/23/97	CK2E2/E2
2. A/MOSCOW/10/99	320	1280	320	160	320	320	01/15/99	E2/E3
3. A/PANAMA/2007/99*	320	1280	640	640	320	640	07/12/99	E4
4. A/FUJIAN/140/2000	320	640	320	1280	160	640	07/30/00	E2/E4
5. A/CHILE/6416/2001*	640	1280	640	640	1280	1280	06/14/01	E2/E2
6. A/CNIC/114/2001	160	640	320	320	160	640	12/13/01	C2/C1
TEST ANTIGENS								
7. A/GEORGIA/05/2002	640	1280	1280	1280	640	1280	01/10/02	M2/C2
8. A/MISSOURI/02/2002	1280	2560	1280	1280	1280	2560	01/09/02	X/C2
9. A/TEXAS/10/2002	1280	5120	1280	1280	2560	5120	01/23/02	M1/C1
10. A/KANSAS/02/2001	640	1280	1280	1280	2560	2560	12/31/01	M1/C1
11. A/KENTUCKY06/2002	1280	2560	1280	1280	1280	2560	01/28/02	X2/C1
12. A/RHODE ISLAND/02/2002	640	2560	1280	1280	640	2560	01/24/02	X1/C1
13. A/ARIZONA/01/2002	1280	2560	1280	1280	2560	2560	01/29/02	X1/C1
14. A/MARYLAND/07/2002	640	1280	1280	640	1280	1280	01/28/02	X/C1
15. A/MASSACHUSETTS/01/2002	1280	2560	1280	1280	1280	2560	02/01/02	X/C1
16. A/NEW MEXICO/02/2002	640	1280	640	640	1280	1280	01/09/02	X1/C1
17. A/NEW YORK/03/2002	640	2560	640	1280	640	1280	01/23/02	X/C2
18. A/MICHIGAN/01/2002	640	1280	640	640	1280	1280	01/28/02	X2/C1
19. A/SOUTH DAKOTA/01/2002	640	1280	640	640	1280	1280	01/31/02	X1/C1
20. A/IOWA/03/2002	640	1280	640	640	640	640	01/04/02	X1/C2
21. A/WYOMING/02/2002	320	640	320	640	320	640	01/31/02	X1/C2
22. A/RHODE ISLAND/03/2002	320	1280	320	640	320	1280	01/31/02	X1/C1
23. A/FLORIDA/04/2002	640	1280	320	640	320	640	01/19/02	X1/C2
24. A/LOUISIANA/05/2002	640	1280	320	640	640	1280	01/21/02	X/C2
25. A/ARKANSAS/01/2002	160	320	160	320	320	640	01/28/02	X1/C1
26. A/LYON/CHU/24224/01	640	2560	1280	640	2560	2560	12/20/01	C2/C1
27. A/LYON/1413/01	640	1280	640	640	1280	1280	12/26/01	C2/C1
28. A/LYON/1407/01	160	640	160	320	320	320	12/26/01	C2/C2

* Serology antigen

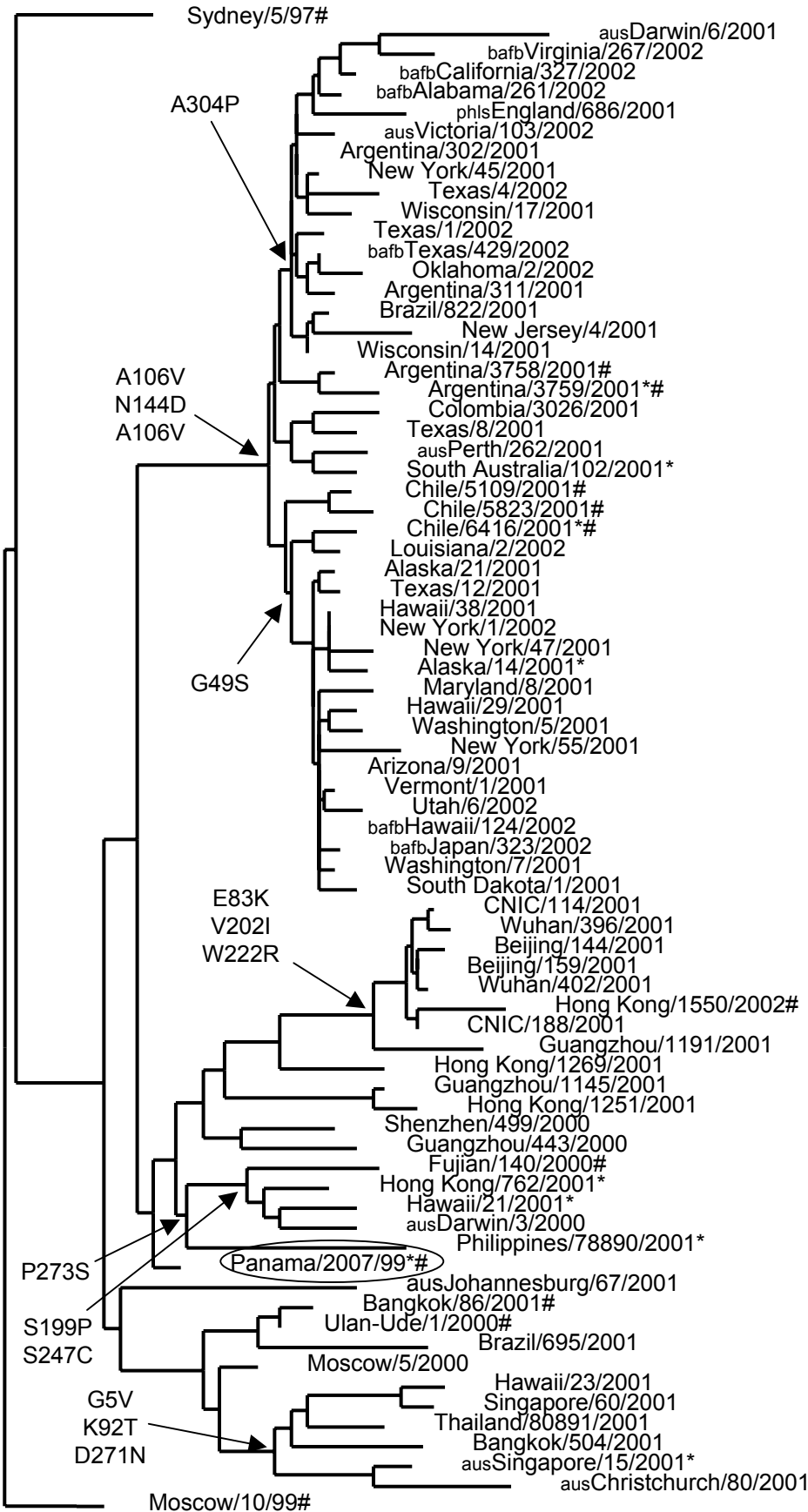
Influenza A(H3N2) Isolates Characterized by CDC

	U.S.A.	North America	Europe	Asia	Cent/So America	Africa, Australia, New Zealand	Total (%)
October 2000 - March 2001							
A/Panama/2007/99-like	24	2	4	52	16	2	100 (96%)
A/Panama/2007/99-like (low)				4			4 (4%)
						Total	104
April 2001 - September 2001							
A/Panama/2007/99-like	8	1		28	90	6	133 (94%)
A/Panama/2007/99-like (low)				2	6		8 (6%)
						Total	141
October 2001 - January 2002							
A/Panama/2007/99-like	220	8	3	9	3	5	248 (97%)
A/Panama/2007/99-like (low)	4		1	2			7 (3%)
						Total	255
Total	256	11	8	97	115	13	500

Preliminary Data

02/22/02

Evolutionary Relationships Among Influenza A (H3N2) Hemagglutinin (HA1) Genes



* Serology Antigen
 # Egg Isolate
 (vaccine strain)

10 nucleotides

Influenza B Viruses

HEMAGGLUTININ INHIBITION REACTIONS OF INFLUENZA TYPE B VIRUSES (02/21/02)

STRAIN DESIGNATION	REFERENCE FERRET ANTISERA							Date collected	
	A SIC/379	B VIC/504	C SHIZ/15	D JOH/69	E BJ/243	F HK/22	G HK/330		
1. B/SICHUAN/379/99*	640	80	1280	320	20	5	20	12/02/99	E2/E4
2. B/VIC/504/2000*	640	160	1280	640	10	10	20	12/18/00	CEK1E12/E1
3. B/SHIZUOKA/15/2001*	320	80	1280	640	10	5	10	01/17/01	E3/E2
4. B/JOHANNESBURG/69/2001*	320	40	1280	320	10	5	10	06/12/01	EXE1/E1
5. B/BEIJING/243/97	20	5	10	5	320	160	1280	01/09/97	E2/E4
6. B/HONG KONG/22/2001	10	10	10	5	160	640	640	01/18/01	C2/C2
7. B/HONG KONG/330/2001*	10	5	5	5	160	160	640	04/09/01	E2
TEST ANTIGENS									
8. B/NEW YORK/47/2001	320	80	640	320	10	5	5	12/31/01	X/C1
9. B/MISSOURI/01/2002	640	320	1280	640	20	20	10	01/26/02	X/C1
10. B/MICHIGAN/01/2002	320	160	1280	320	20	10	5	01/06/02	X1/C1
11. B/MASSACHUSETTS/01/2002	320	160	640	320	10	10	20	01/18/02	X1/C1
12. B/TEXAS/03/2002	640	80	1280	320	10	20	10	01/29/02	M1/C1
13. B/TEXAS/02/2002	160	80	320	160	20	10	10	01/23/02	M1/C1
14. B/TEXAS/04/2002	160	40	320	160	10	10	5	01/30/02	M1/C1
15. B/TEXAS/05/2002	160	80	640	160	10	10	10	01/30/02	M1/C1
16. B/KIROV/10/2001	320	80	640	320	20	10	10	12/17/01	C1/C1
17. B/KIROV/16/2001	320	80	640	160	10	10	10	12/17/01	C1/C1
18. B/MOSCOW/21/2001	320	160	640	320	10	10	5	12/26/01	C1/C1
19. B/PHILIPPINES/93286/2001	1280	160	1280	640	40	10	40	12/07/01	CX
20. B/TAIWAN/97271/2001	160	80	640	320	5	5	5	12/10/01	CX
21. B/THAILAND/5760/2001	160	80	320	320	10	5	5	12/18/01	CX
22. B/INDIA/77385/2001	160	40	160	160	10	5	5	12/03/01	CX
23. B/NEW YORK/01/2002	10	5	10	10	80	160	160	01/28/02	X/C1
24. B/HONG KONG/1351/2002	5	5	5	5	160	160	320	01/17/02	E1
25. B/MALAYSIA/83077/2001	5	5	5	5	80	80	160	10/30/01	CX
26. B/PHILIPPINES/8619/2001	10	10	10	10	80	160	320	11/21/01	CX
27. B/PHILIPPINES/8445/2001	10	5	5	5	80	160	320	11/28/01	CX
28. B/PHILIPPINES/4894/2001	5	5	5	5	80	160	320	11/28/01	CX
29. B/INIDA/7600/2001	20	5	10	10	80	80	160	12/05/01	CX

* Serology antigen

Influenza B Isolates Characterized by CDC

	U.S.A.	North America	Europe	Asia	Cent/So America	Africa, Australia, New Zealand	Total (%)
October 2000 - March 2001							
B/Beijing/243/97-like		1		1			2 (0.4%)
B/Hong Kong/22/2001-like				12			12 (2%)
B/BJ/184/93-B/Yam/166-like*	20	5		4			29 (5.1%)
B/Sichuan/379/99-like	268	10	29	127	17	34	485 (84.5%)
B/Sichuan/379/99 (low)	24		4	16	2		46 (8%)
						Total	574
April 2001 - September 2001							
B/Hong Kong/22/2001-like	26			19			45 (24%)
B/Sichuan/379/99-like	9		7	31	38	7	92 (49%)
B/Sichuan/379/99 (low)	2	1	3	22	21	1	50 (27%)
						Total	187
October 2001 - January 2002							
B/Hong Kong/22/2001-like	1	2		24	11		38 (53%)
B/Sichuan/379/99-like	6			9	1	2	18 (25%)
B/Sichuan/379/99 (low)	8	1		4	3		16 (22%)
						Total	72
Total	364	20	43	269	93	44	833

Preliminary Data

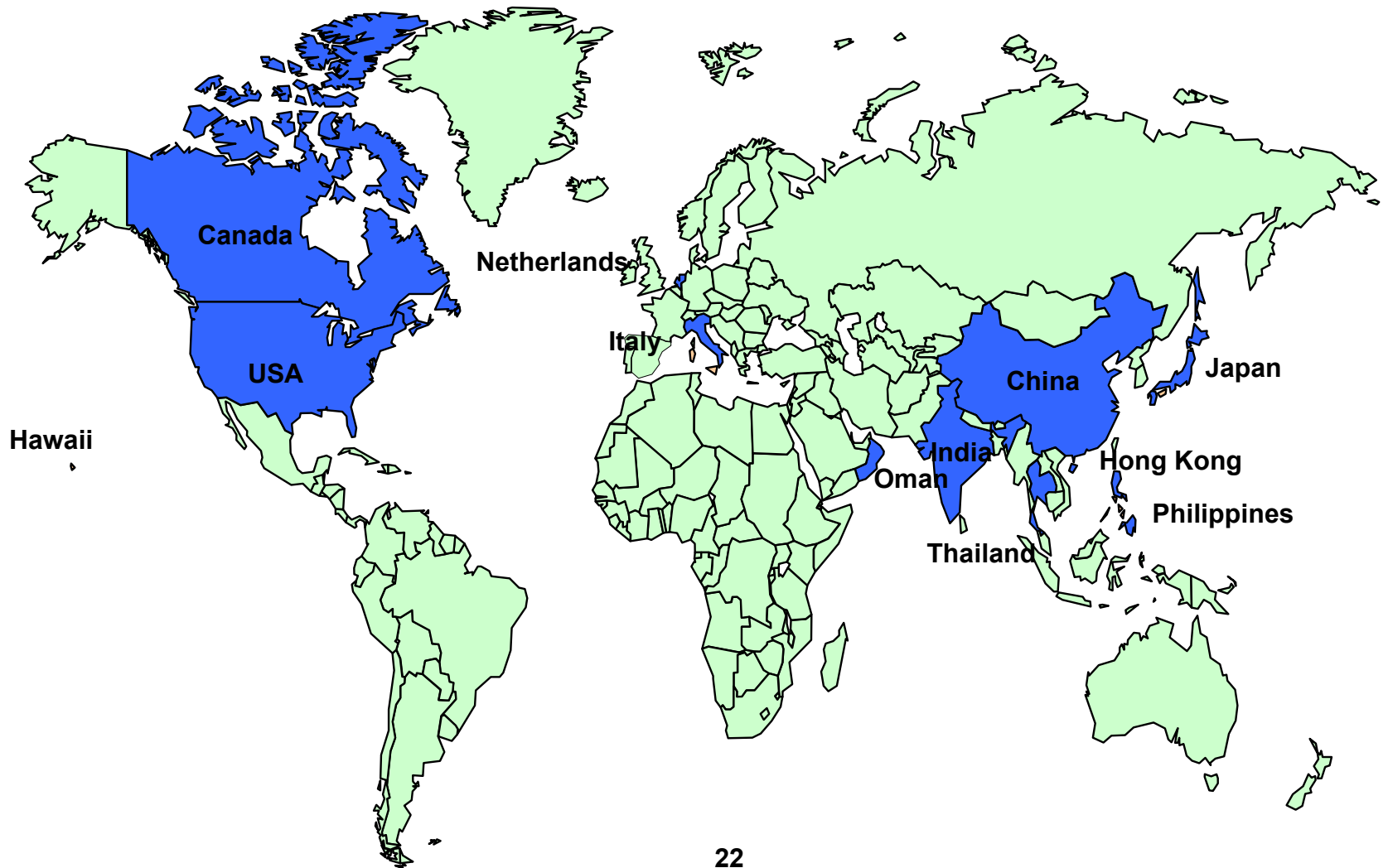
02/22/02

*Includes viruses antigenically related to B/Beijing/184/93, the reference strain, or to the equivalent B/Yamanashi/166/98 vaccine strain.

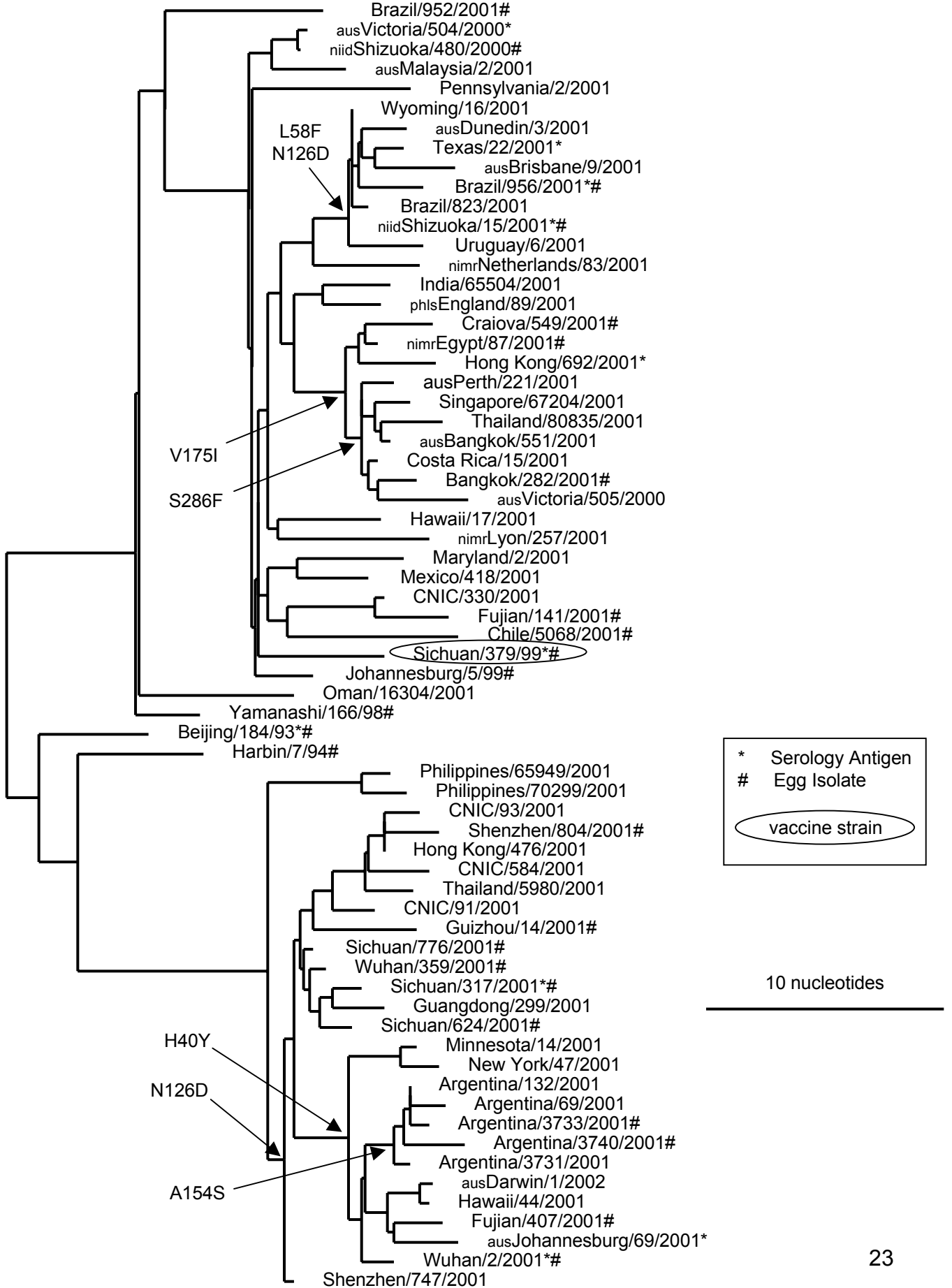
** B/Hong Kong/22/2001 is B/Hong Kong/330/2001-like virus

Geographic Distribution of B/Victoria/02/87 Lineage Viruses

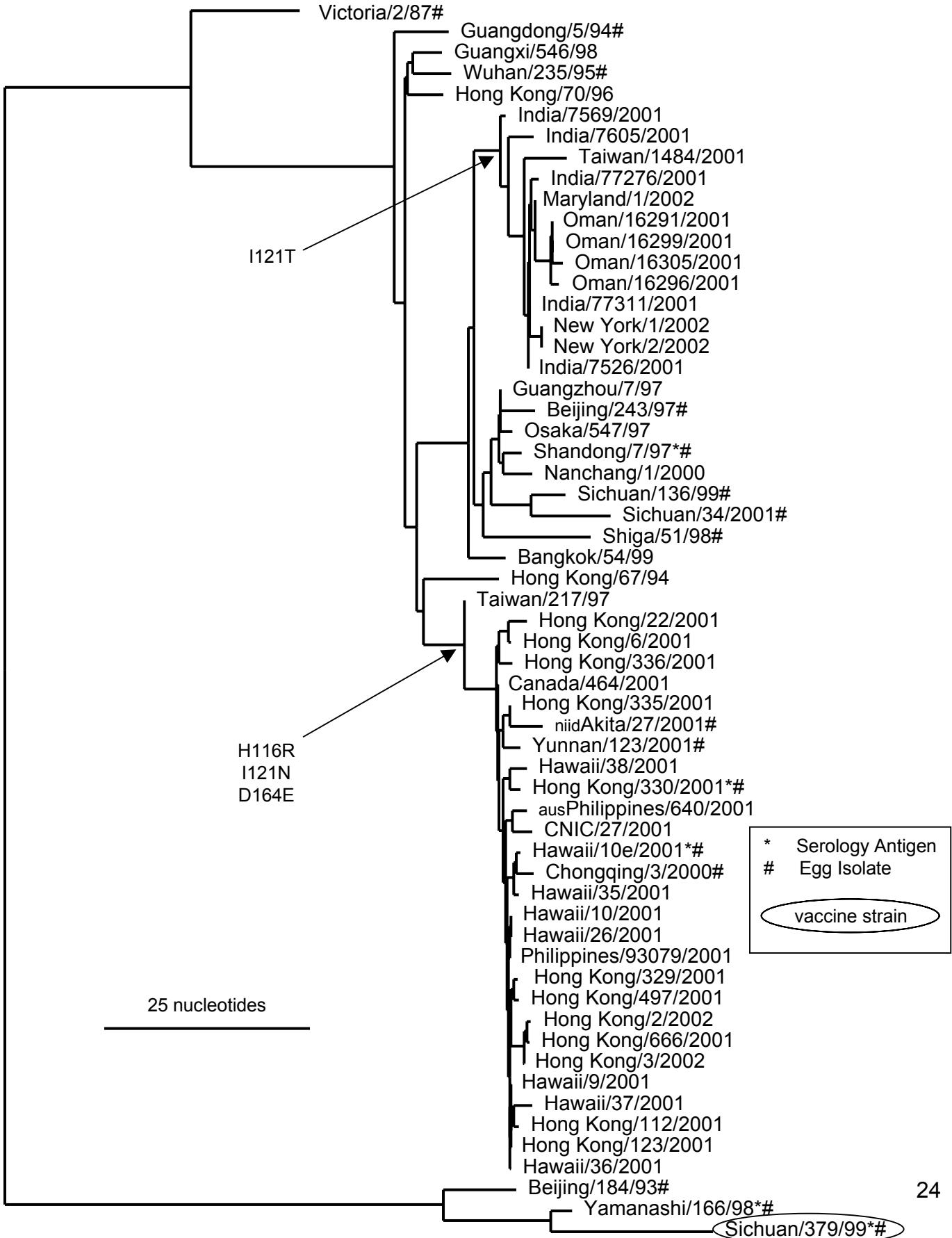
April 2001 to Present



Evolutionary Relationships Among Influenza B Hemagglutinin (HA1) Genes (Yamagata Lineage)



Evolutionary Relationships Among Influenza B Hemagglutinin (HA1) Genes (Victoria Lineage)



Restriction Analysis of Influenza B Isolates

	U.S.A.	North America	Europe	Asia	Cent/So America	Africa, Australia, New Zealand	Total (%)
October 2000 - March 2001							
B/Victoria/02/87-like				8			8 (4%)
B/Yamanashi/166/98-like/ B/Sichuan/379/99-like	86	8	18	39	21	1	173 (79%)
B/Harbin/07/94-like		2		36			38 (17%)
						Total	219
April 2001 - September 2001							
B/Victoria/02/87-like	28			21			49 (26%)
B/Yamanashi/166/98-like/ B/Sichuan/379/99-like	9	1	4	26	70	1	111 (59%)
B/Harbin/07/94-like				14	12	1	27 (15%)
						Total	187
October 2001 - January 2002							
B/Victoria/02/87-like	3	2		39			44 (40%)
B/Yamanashi/166/98-like/ B/Sichuan/379/99-like	12	1	9	20	5	1	48 (44%)
B/Harbin/07/94-like	6		1	10		1	18 (16%)
						Total	110
Total	144	14	32	213	108	5	516

Preliminary Data

02/22/02