INFORMATION FOR THE VACCINES AND RELATED BIOLOGICAL PRODUCTS ADVISORY COMMITTEE, CBER, FDA

February 16-17, 2005

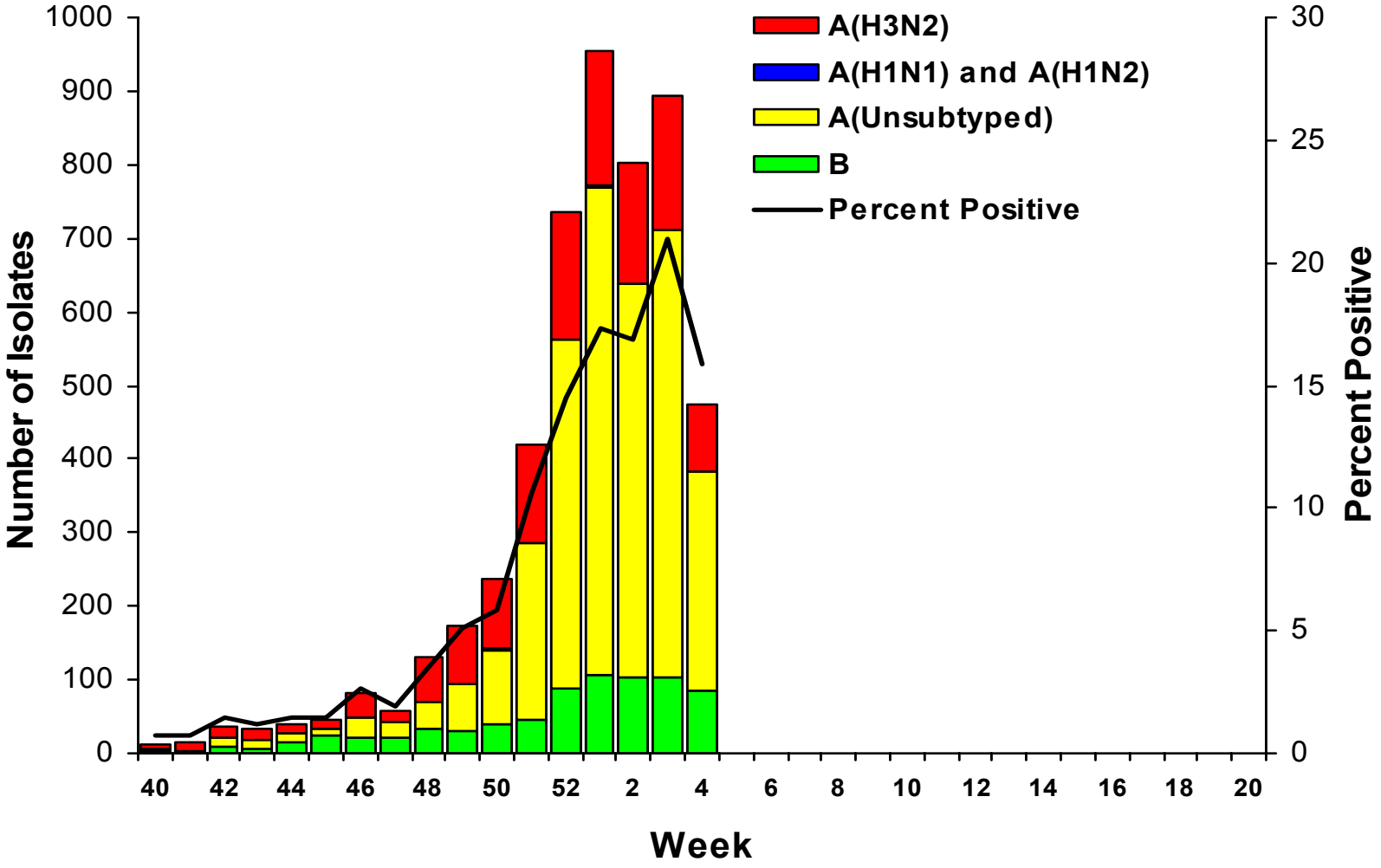
Bethesda, MD

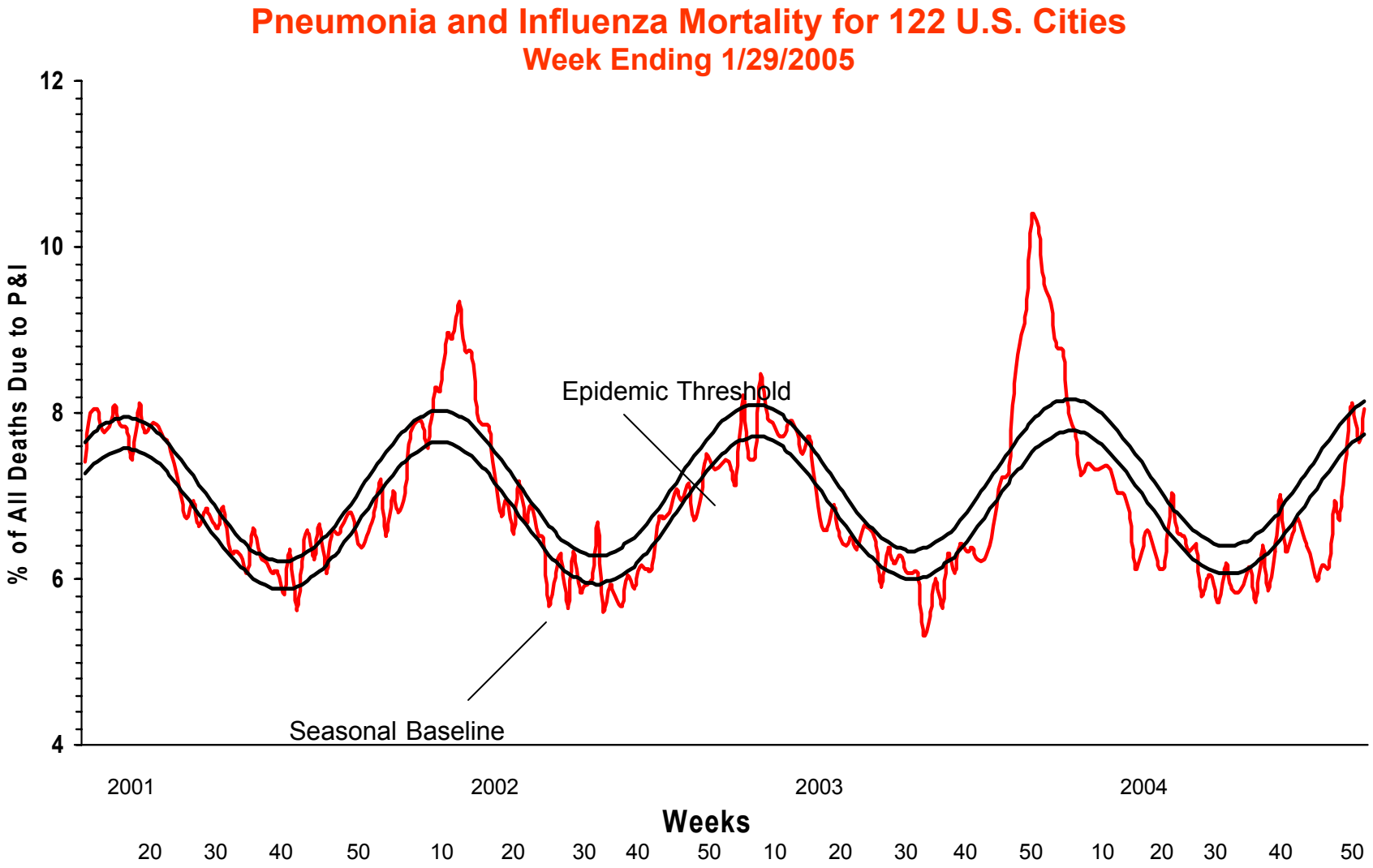
WHO COLLABORATING CENTER FOR SURVEILLANCE, EPIDEMIOLOGY AND CONTROL OF INFLUENZA

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

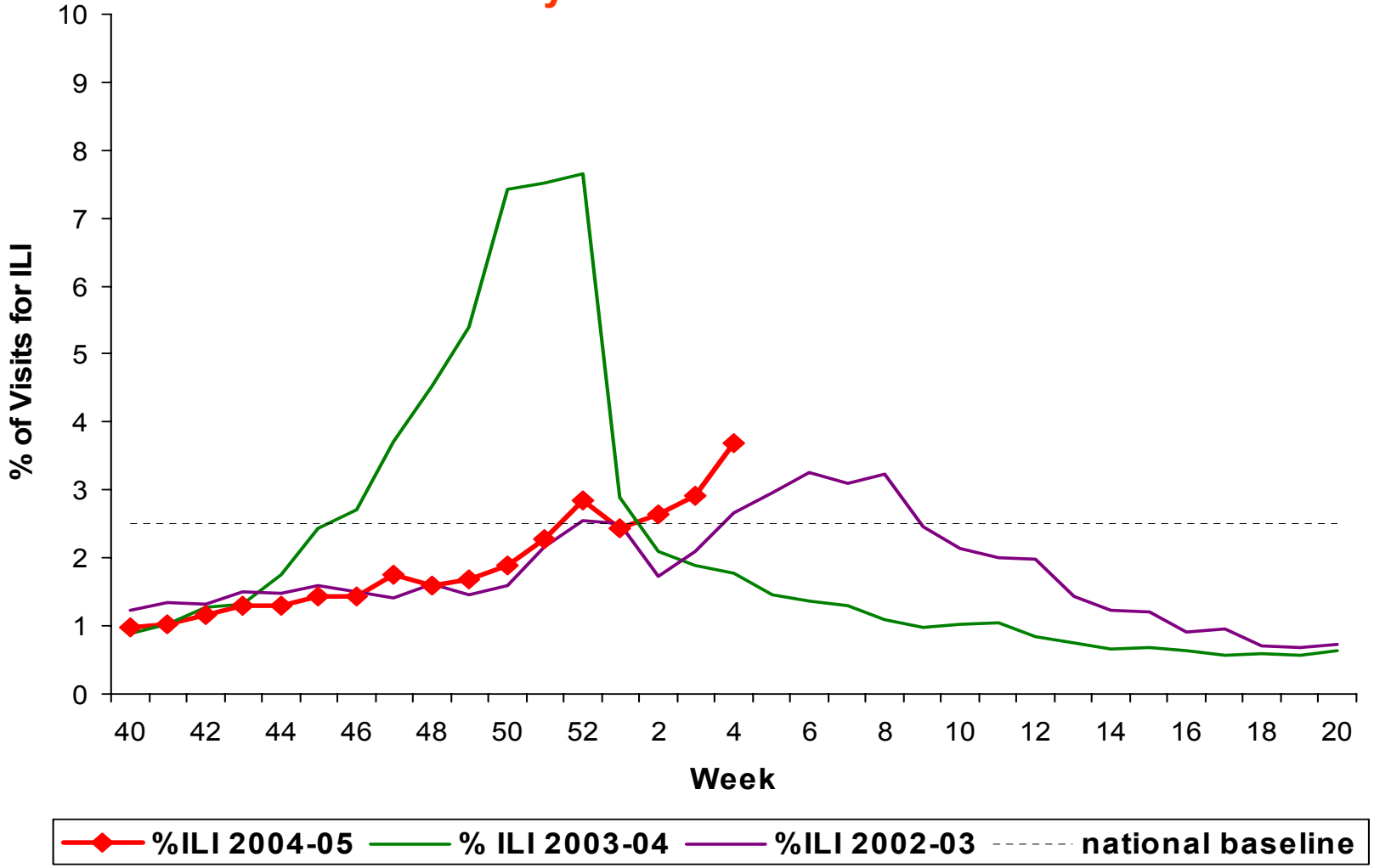
US Surveillance

U.S. WHO/NREVSS Collaborating Laboratories Summary, 2004-05



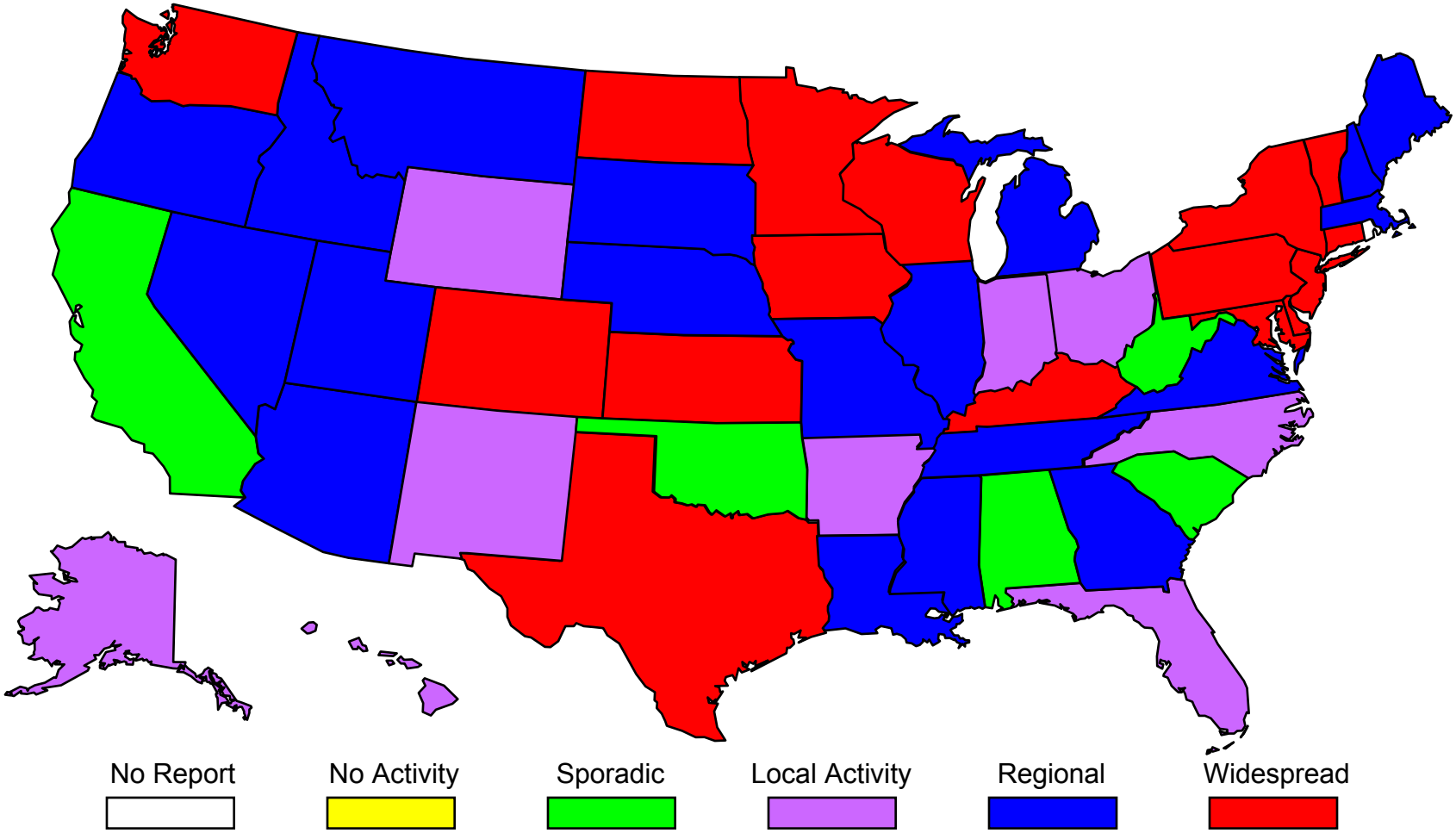

Pneumonia and Influenza Mortality for 122 U.S. Cities
Week Ending 1/29/2005
% of All Deaths Due to P&I
12
10
8
6
4
Epidemic Threshold
Seasonal Baseline
2001
2002
2003
2004
Weeks
20 30 40 50 10 20 30 40 50 10 20 30 40 50 10 20 30 40 50

Percentage of Visits for Influenza-like Illness Reported by Sentinel Providers, National Summary 2004-05 and Previous 2 Seasons



Weekly Influenza Activity Estimates Reported by State & Territorial Epidemiologists

Week ending January 29, 2005 - Week 4



Influenza Viruses Isolated and Characterized Worldwide

(October 2004-February 2005)

Influenza Virus Isolates Characterized by CDC and Other WHO Collaborating Centers and Laboratories *
(October 2004 – February 2005)

	North America	Europe	Asia	Cent/So America	Africa, Oceania	Total (%)
A(H1N1)	2	91	74		2	169 (8%)
A(H3N2)	533	365	212	4	458	1572 (75%)
B/Yamagata	85	58	30	1	112	286 (14%)
B/Victoria	18	15	16	3	9	61 (3%)
Total	638	529	332	8	581	2088

Preliminary Data 02/08/2005

* Data based on cumulative influenza virus isolates antigenic characterization data provided by WHO Collaborating Centers in Atlanta, London, Melbourne, Tokyo, reports from European Influenza Surveillance Scheme and National Influenza Center, Canada

Influenza A(H1N1) Viruses

HEMAGGLUTINATION INHIBITION REACTIONS OF INFLUENZA H1 VIRUSES (01/12/05)

		REFERENCE FERRET ANTISERA								
REFERENCE ANTIGENS		BJ/262	NC/20	FUJ/156	NEI/52	CI/8885	HI/10	PE/3135	Date collected	Passage
1	A/BEIJING/262/95	640	640	160	320	320	320	40	01/09/95	E3/E3
2	A/N. CALEDONIA/20/99 *	160	640	320	320	320	160	160	06/09/99	E4/E2
3	A/FUJIAN/156/2000	80	640	320	320	160	80	80	08/25/00	E2/E2
4	A/NEIMENGGU/52/2002	40	320	160	320	160	80	40	01/25/02	E2/E4
5	A/CHILE/8885/2002	40	320	160	160	320	40	20	07/03/02	E1/E4
6	A/HAWAII/10/2002	80	640	80	160	160	160	20	03/22/02	E3
7	A/PERU/3135/2003	160	40	80	20	10	10	640	04/09/03	X/C3
TEST ANTIGENS										
8	A/FLORIDA/04/2004 *	320	1280	1280	1280	640	320	320	12/20/04	X1/C1
9	A/FLORIDA/03/2004	320	1280	640	640	320	160	320	12/09/04	X2/C1
10	A/PRACHINBURI/1749/2004	320	1280	1280	1280	320	320	640	09/18/04	C1/C1
11	A/BANGKOK/1757/2004	320	1280	1280	1280	640	320	640	09/20/04	C1/C1
12	A/PRACHINBURI/1817/2004	320	1280	1280	1280	640	320	640	09/23/04	C1/C1
13	A/BANGKOK/1876/2004	320	1280	1280	1280	640	320	320	09/27/04	C1/C1
14	A/SUPHANBURI/2131/2004	320	1280	1280	1280	640	320	320	10/04/04	C1/C1
15	A/BANGKOK/1752/2004	320	1280	640	1280	320	320	320	09/20/04	C1/C1
16	A/SUPHANBURI/2130/2004	160	1280	640	1280	320	160	320	10/04/04	C1/C1
17	A/BANGKOK/1822/2004	160	1280	640	1280	320	160	320	09/23/04	C1/C1
18	A/RATCHABURI/1847/2004	320	1280	640	640	320	160	320	09/24/04	C1/C1
19	A/BANGKOK/1544/2004 *	160	640	320	640	320	160	160	08/31/04	E3/E1
20	A/SUPHANBURI/2129/2004	160	640	640	640	320	160	160	10/04/04	C1/C1
21	A/SAKAEW/2132/2004	160	640	320	640	320	80	320	10/04/04	C1/C1
22	A/SINGAPORE/14/2004	160	1280	640	640	320	160	160	03/31/04	E4/E1
23	A/N. CALEDONIA/9/2004	160	1280	640	640	320	160	320	06/11/04	E2/E1
24	A/N. CALEDONIA/3/2004	160	640	640	640	320	160	160	04/19/04	E2/E1
25	A/MALAYSIA/1513/2004	160	640	320	640	160	160	320	07/10/04	E2/E1
26	A/HONG KONG/4555/2004	160	640	640	640	320	160	160	09/25/04	C2/C1
27	A/HONG KONG/4580/2004	160	640	640	640	320	160	160	10/08/04	C2/C1
28	A/HONG KONG/4596/2004	160	1280	1280	1280	640	320	320	10/25/04	C2/C1

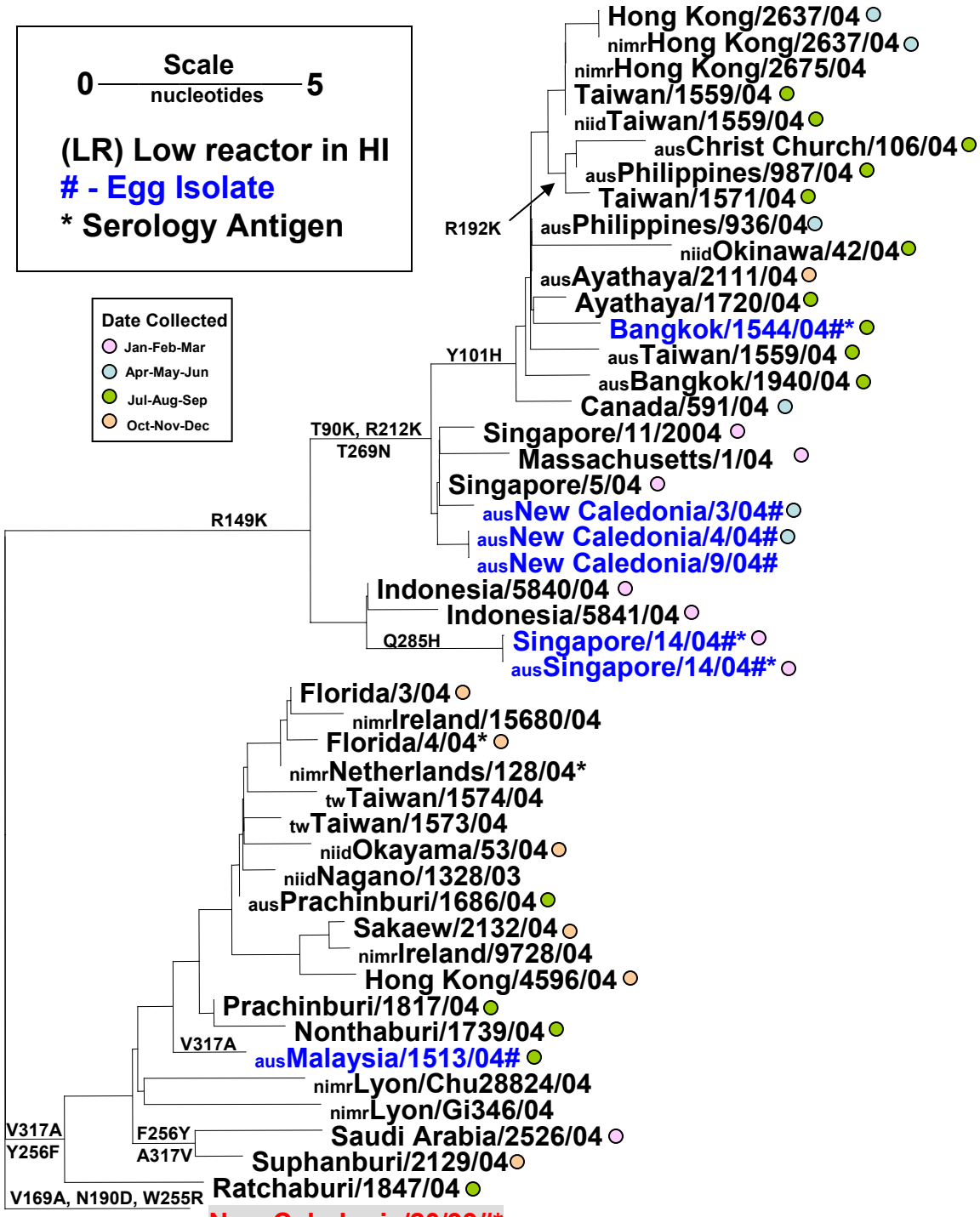
* Serology antigens

Influenza A(H1) Isolates Characterized by CDC

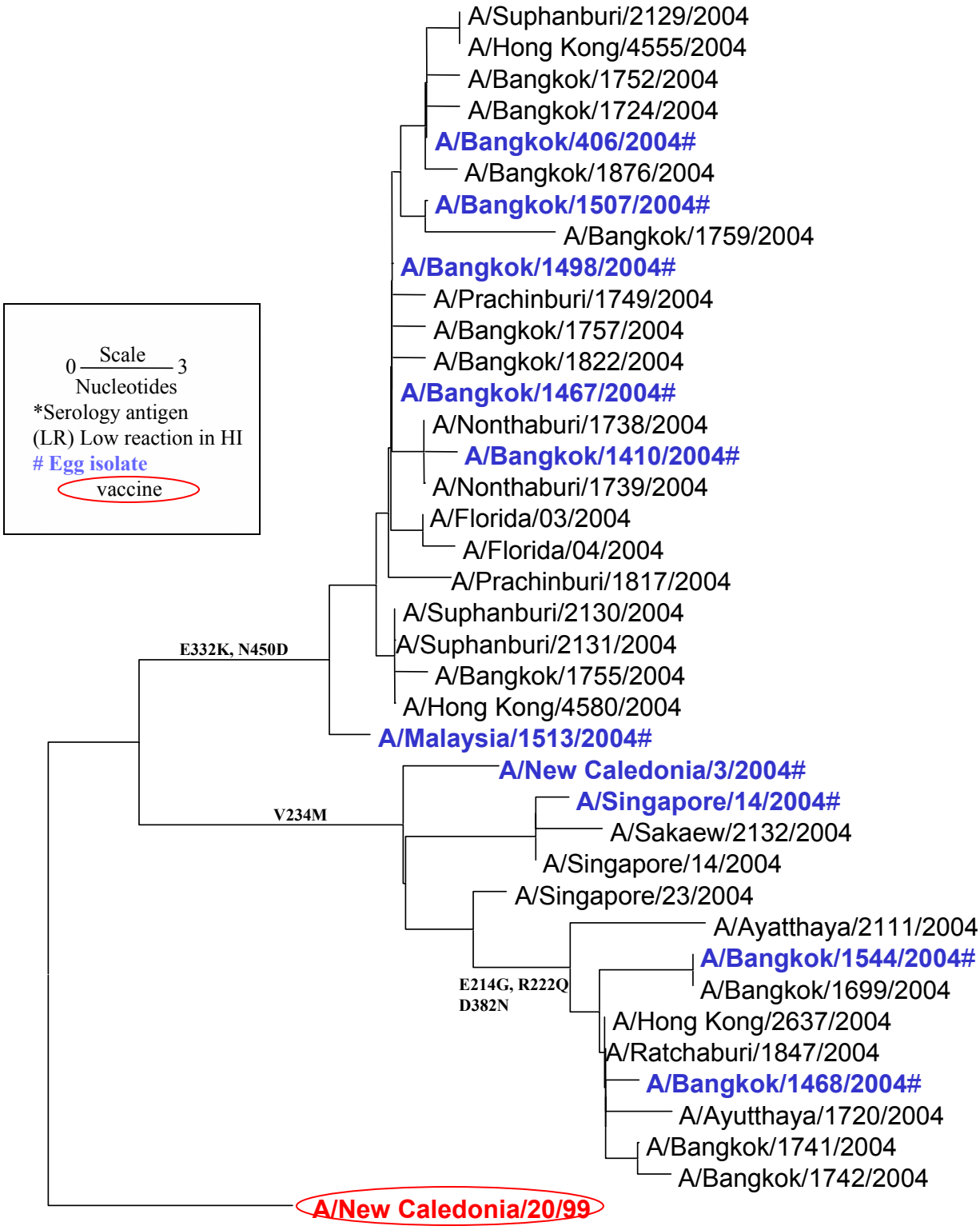
	U.S.A.	North America	Europe	Asia	Cent/So America	Africa, Australia, New Zealand	Total (%)
April 2003 – September 2003							
A/N.Caledonia/20/99-like	10	4	3		116	2	135 (96%)
A/N.Caledon./20/99 (low)					6		6 (4%)
						Total	141
October 2003 – March 2004							
A/N.Caledonia/20/99-like	3	2	1	16	1	2	25 (9%)
A/N.Caledon./20/99 (low)			2		1		3 (11%)
						Total	28
April 2004 – September 2004							
A/N.Caledonia/20/99-like		1	4	36		2	43 (98%)
A/N.Caledon./20/99 (low)				1			1 (2%)
							44
October 2004 – January 2005							
A/N.Caledonia/20/99-like	2			12			14 (100%)
A/N.Caledon./20/99 (low)							
							14
Total	15	7	10	65	124	6	227

Preliminary Data 01/28/2005

Evolutionary Relationships Among Influenza A (H1N1) Hemagglutinin (HA1) Genes, 2004/05



Evolutionary Relationships Among Influenza A N1 Neuraminidase genes



Hemagglutination Inhibition Antibody Responses to the H1* Component of the 2004 -2005 Influenza Vaccine

ADULT POPULATIONS

						% with HI titer ≥ 40	
Sera	N	Antigen	% Rise	Pre GMT	Post GMT	Pre Vaccine	Post Vaccine
Japan[1]	30	A/New Caledonia/20/99 IVR-116*	23	21	44	43	67
	30	A/Bangkok/1544/2004	17	26	54	53	77
	30	A/Florida/04/2004	17	27	54	53	73
	30	A/Netherlands/128/2004	27	27	59	57	77
USA[2]	25	A/New Caledonia/20/99 IVR-116*	32	19	54	44	76
	25	A/Bangkok/1544/2004	32	23	57	40	76
	25	A/Florida/04/2004	24	24	53	48	80
	25	A/Netherlands/128/2004	24	26	66	52	80

Preliminary Data 01/26/2005

1. Sera were kindly provided by Dr. Takato Odagiri, WHO Collaborating Center, Tokyo, Japan. The populations were vaccinated with the 2004-2005 trivalent influenza vaccine containing 15:g each of A/Fujian/411/2002(H3N2)-like, A/New Caledonia/20/99(H1N1)-like, and B/Shanghai/361/2002-like hemagglutinin.
2. Sera were kindly provided by Dr. Roland Levandowski, FDA, Bethesda, MD. The populations were vaccinated with the 2004-20005 trivalent influenza vaccine containing 15:g each of A/Fujian/411/2002(H3N2)-like, A/New Caledonia/20/99(H1N1)-like, and B/Shanghai/361/2002-like hemagglutinin

- A/New Caledonia/20/99 is the H1N1 component of the vaccine.

Hemagglutination Inhibition Antibody Responses to the H1* Component of the 2004 -2005 Influenza Vaccine

ELDERLY POPULATIONS

						% with HI titer ≥ 40	
Sera	N	Antigen	% Rise	Pre GMT	Post GMT	Pre Vaccine	Post Vaccine
Japan[1]	30	A/New Caledonia/20/99 IVR-116*	43	8	20	10	33
	30	A/Bangkok/1544/2004	37	9	19	13	33
	30	A/Florida/04/2004	40	9	17	10	27
	30	A/Netherlands/128/2004	43	9	22	17	43
USA[2]	25	A/New Caledonia/20/99 IVR-116*	12	12	18	12	32
	25	A/Bangkok/1544/2004	8	16	22	20	40
	25	A/Florida/04/2004	8	16	21	20	32
	25	A/Netherlands/128/2004	0	21	26	36	52

Preliminary Data 01/26/2005

1. Sera were kindly provided by Dr. Takato Odagiri, WHO Collaborating Center, Tokyo, Japan. The populations were vaccinated with the 2004-2005 trivalent influenza vaccine containing 15:g each of A/Fujian/411/2002(H3N2)-like, A/New Caledonia/20/99(H1N1)-like, and B/Shanghai/361/2002-like hemagglutinin.
2. Sera were kindly provided by Dr. Roland Levandowski, FDA, Bethesda, MD. The populations were vaccinated with the 2004-20005 trivalent influenza vaccine containing 15:g each of A/Fujian/411/2002(H3N2)-like, A/New Caledonia/20/99(H1N1)-like, and B/Shanghai/361/2002-like hemagglutinin

- A/New Caledonia/20/99 is the H1N1 component of the vaccine.

Hemagglutination Inhibition Antibody Responses to the H1* Component of the 2004 -2005 Influenza Vaccine

PEDIATRIC POPULATION (6-23 months old)

						% with HI titer ≥ 40	
Sera	N	Antigen	% Rise	Pre GMT	Post GMT	Pre Vaccine	Post Vaccine
USA[1]	30	A/New Caledonia/20/99 IVR-116*	83	5	30	0	57
	30	A/Bangkok/1544/2004	63	5	18	0	30
	30	A/Florida/04/2004	27	5	9	0	7
	30	A/Netherlands/128/2004	40	5	13	0	17

Preliminary Data 01/26/2005

1. Sera were kindly provided by Dr. William Koch and Tammy Anders, Virginia Commonwealth University. The population was vaccinated with two doses of the 2004-2005 trivalent influenza vaccine containing 15 ug each of A/Fujian/411/2002(H3N2)-like, A/New Caledonia/20/99(H1N1)-like, and B/Shanghai/361/2002-like hemagglutinin

- A/New Caledonia/20/99 is the H1N1 component of the vaccine.

Hemagglutination Inhibition Antibody Responses to the H1* Component of the 2004 -2005 Influenza Vaccine

PEDIATRIC POPULATION (5-8 years old)

N	Antigen	% Raise	GMT		% with HI titer ≥ 40	
			Pre	Post	Pre	Post
264	A/New Caledonia/20/99 IVR-116	97	14	274	32	93

Preliminary Data 12/15/2004

* Sera were kindly provided by Dr. Kathleen Neuzil, Group Health Cooperative, University of Washington. The population was vaccinated with two doses of the 2004-2005 trivalent influenza vaccine containing 15 ug each of A/Fujian/411/2002(H3N2)-like, A/New Caledonia/20/99(H1N1)-like, and B/Shanghai/361/2002-like hemagglutinin