



## LOS ANGELES COUNTY INFLUENZA SUMMARY, 2003–2004: IN LIKE A LION, OUT LIKE A LAMB

While numerous years of surveillance have identified some common influenza trends (i.e., the general time of onset and peak), these trends are not absolute—even core aspects can change in a given year, as was evident during and the 2003–2004 season. Both locally and nationwide, the season peaked several weeks earlier than expected. But even more surprising and unusual was how widespread and simultaneously activity peaked; instead of peaking sporadically across the nation, nearly all states reported their peak activity at about the same, and again, earlier in the season than expected.

Similarly, despite numerous years of public health education and vaccination campaigns, the public's reaction to each influenza season is also unpredictable. During most years, the public, as a whole, is apathetic, and considerable effort is required to encourage vaccination—but then in other years, demand and concern soars. Mirroring the quick and widespread peak in influenza activity during the 2003–2004 season, the public's reaction also underwent an astoundingly rapid shift from disinterest in early November to extreme concern and fear by December. This was fostered by intense media attention and especially by reports of influenza-related pediatric deaths that occurred in Colorado in late-November. While there were no shortages, delays or substantial demand for vaccination at the beginning of the season, the public's sudden and unpredicted attitude change caused shortages and long lines at many facilities.

However, despite the intense concern and attention influenza received during this season, a review of local and national surveillance measures indicates the overall severity of the season was actually quite typical—while more severe than the previous three years which were exceptionally mild, the season was comparable, if not lower, in levels of morbidity and mortality to other seasons characterized by a type A viral strain, such as the 1999–2000 season.

The following summarizes the major events that occurred during the 2003–2004 influenza season as well as surveillance efforts that detail the occurrence and impact of influenza.

### EVENT SUMMARY

During December 2003, the U.S. media depicted nationwide influenza activity as unusually and unexpectedly severe and deadly—and their numerous fear-provoking reports instigated a ground swell of intense public anxiety and demand for vaccination. However, the impending severity of the 2003–2004 season wasn't entirely unexpected. Even before vaccination clinics were opened across the nation, there were indications that upcoming season would be especially severe. Because the southern hemisphere experiences its winter season during our summer months, what occurs below the equator sometimes serves as a precursor or sequel for activity in the northern hemisphere. In August 2003, reports of unexpectedly severe influenza activity were received from New Zealand and Australia. In addition to epidemic levels of morbidity and mortality, three factors were especially foreboding. First, among the influenza viruses circulating in the southern hemisphere, the overwhelmingly predominant virus type was type A H3N2—a form of influenza virus that tends to yield more intense symptoms and resulting higher levels of illness and death than other forms of the virus. Moreover, this particular strain of influenza (A/Fujian/411/2003) was a novel drifted strain, not included in recent vaccination compositions, and as such, existing public immunity was unlikely. Third, the identification of this strain and the subsequent predictions that it would also likely impact the U.S. occurred too late to modify the 2003–2004 U.S. influenza vaccine composition. Thus as early as August of 2003, more than 5 months before the media picked up the story, public health officials in the U.S. were bracing for what would most likely be a severe season caused by an impending novel and virulent influenza virus about to hit a immunologically naïve population.

But despite the warnings from Public Health urging vaccination and preparation for the influenza season, initial interest was mild at best. No shortages, delays or staggered scheduling impacted influenza vaccination—in fact, there was actually more vaccine available this season than previously—and vaccination clinics proceeded with limited public demand. Similarly, the debut of FluMist, a live attenuated influenza vaccine administered via a nasal spray, was a disaster; as of mid-November 2003, only 400,000

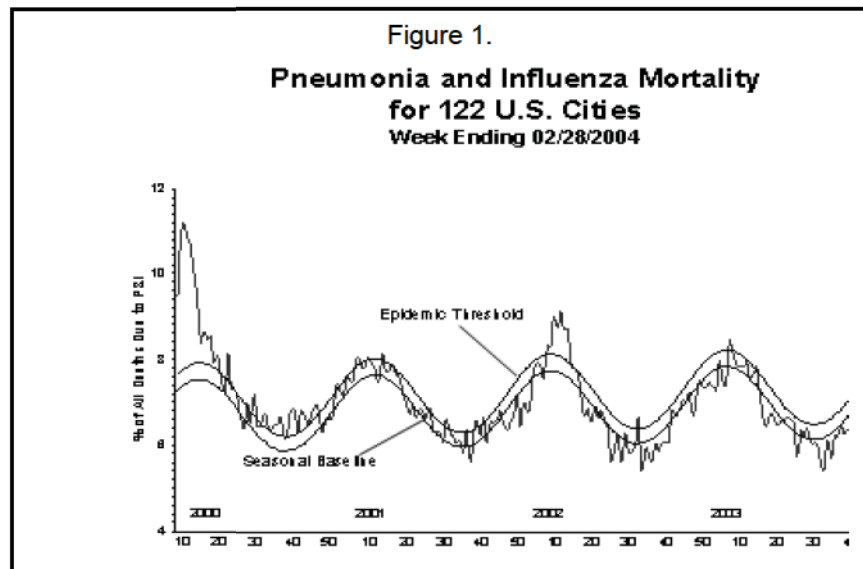


doses were sold to pharmacies and doctors' offices—a far cry from the manufacturer's forecasted sales of 4 to 6 million doses.

But by early December, public interest in influenza changed dramatically. Several events likely contributed to the sudden heightened attention and fear of influenza. First, during mid-November, media interest was piqued by a report published in the *New York Times* which predicted that the 2003–2004 influenza season would be the “worst in 30 years” leading to unprecedented illness and death. Shortly after, the Colorado Department of Health began reporting a series of pediatric deaths associated with influenza. This received extensive media attention and was followed up by media reports of additional influenza-related pediatric deaths in other states across the nation. While deaths due to influenza, including pediatric deaths, occur every year, there was concern that the novel Fujian strain was particularly virulent among pediatric cases. Accordingly, the CDC initiated a special research project requesting active surveillance for pediatric intensive care (ICU) patients and deaths with evidence of influenza infection. By mid to late-December, public demand for vaccination reached an all-time high, and the sudden surge in people who wanted vaccination caused long lines and shortages in many areas. Oddly, the surge in interest in influenza corresponded with the peak in cases both locally and nationwide; incident influenza cases reached their highest level peaked during weeks 50–52. The number of new cases and corresponding public interest both quickly declined into the New Year.

## NATIONAL INFLUENZA SURVEILLANCE FINDINGS

The onset, acceleration and duration of influenza activity during the 2003–2004 season were surprising and dissimilar from the three previous years. However, contrary to public perception and media depiction, the overall severity of the season was actually not out-of-the-ordinary—especially as compared to seasons characterized by prevalent type A strains in circulation as last occurred during the 1999–2000 season. This is best illustrated by the national pneumonia and influenza mortality rates (Figure 1). The percent of pneumonia



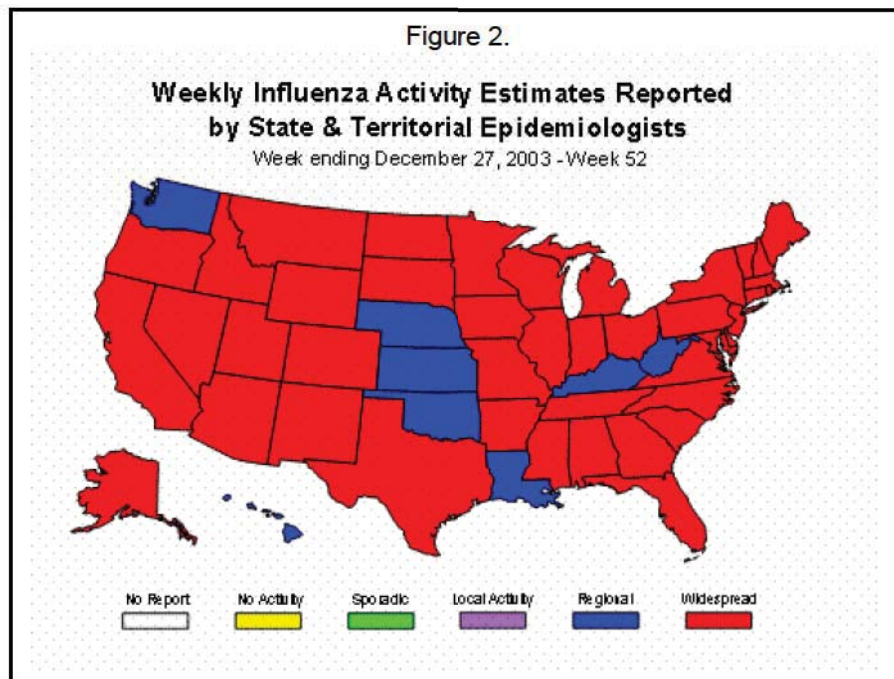
and influenza-related deaths that occurred during 2003–2004 was similar to 1999–2000. However, the duration of the 2003–2004 peak activity was shorter than that comparable season and occurred earlier than predicted by the established epidemic threshold curve. The small 2002 peak in activity at the center of the graph depicts the late-season influenza outbreaks caused by a novel type B strain that, like most type B influenza outbreaks, predominantly affected young children (described previously in the 2001 ACDC Special Reports<sup>1</sup>). These national statistics can also help explain the intense public interest that influenza received this season. Since activity was so mild for the past three years, it is understandable that the 2003–2004 might seem unusual as compared to recent memory.

But more telling is the CDC's weekly map indicating levels of influenza activity occurring across the nation (Figure 2). During week 52, nearly the entire nation reported the highest level of influenza activity, “regional” activity. Rarely have so many states reported this high level of activity concurrently; more typically, peak levels of influenza activity occur sporadically in states across the nation, often first in the eastern states then peaking gradually westward. Moreover, not only was this nationwide simultaneous

<sup>1</sup> Reynaldo S. Late season, light season: Los Angeles County influenza surveillance and elementary school outbreaks, 2001–2002. Acute Communicable Disease Control Special Studies Report 2001: 13–17. Available at: [www.lapublichealth.org/acd/reports/annual/Special%20Report%202001.pdf](http://www.lapublichealth.org/acd/reports/annual/Special%20Report%202001.pdf)



peak in incidence unique, its early occurrence was also surprising—on average, nationwide influenza incidence more typically peaks several weeks later after the new year. Again, this likely contributed to the misperception that the season was unusually severe.



## LOS ANGELES COUNTY INFLUENZA SURVEILLANCE FINDINGS

Influenza surveillance presents a unique challenge since individual cases are not reportable or counted by health departments. Tracking individual cases would overwhelm any health department because so many people are susceptible and infected yearly; during a mild season it is estimated about 10% to 15% of the population becomes infected, in a more severe season, 20% or more of the population can suffer from influenza. As such, in order to assess the local seasonal pattern of influenza activity, our county relies on positive influenza viral isolates reported from sentinel hospital laboratories. When combined with clinical information from the community, these isolate reports are a valuable resource since they describe the onset, peak and duration of influenza activity. In addition, since this surveillance method is fairly consistent from season to season, it provides a practical means of comparing seasons.

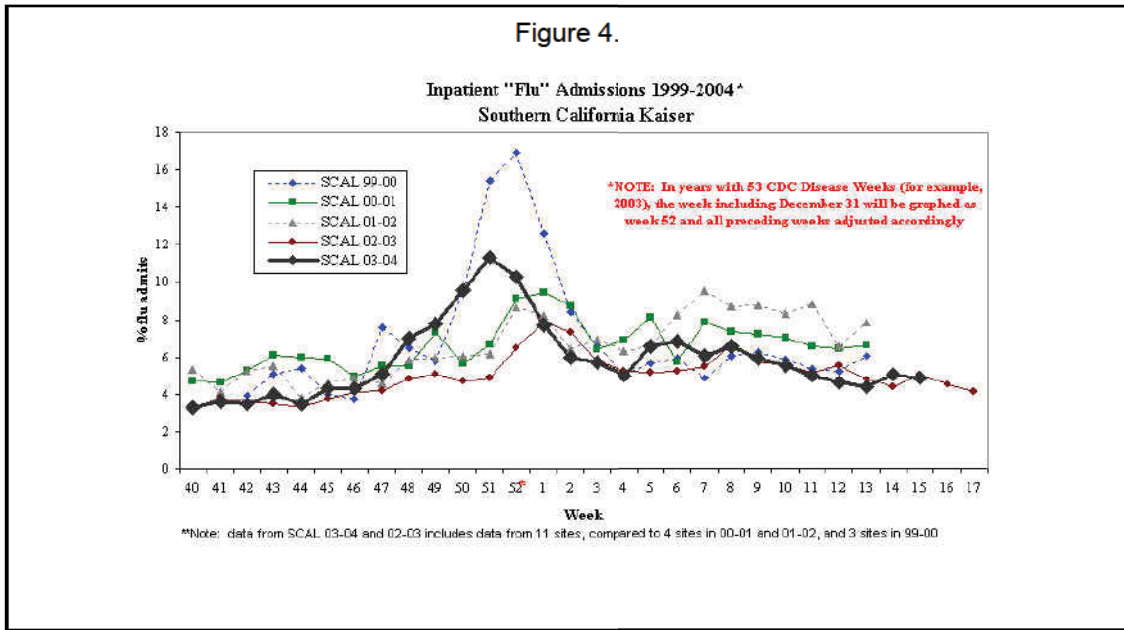
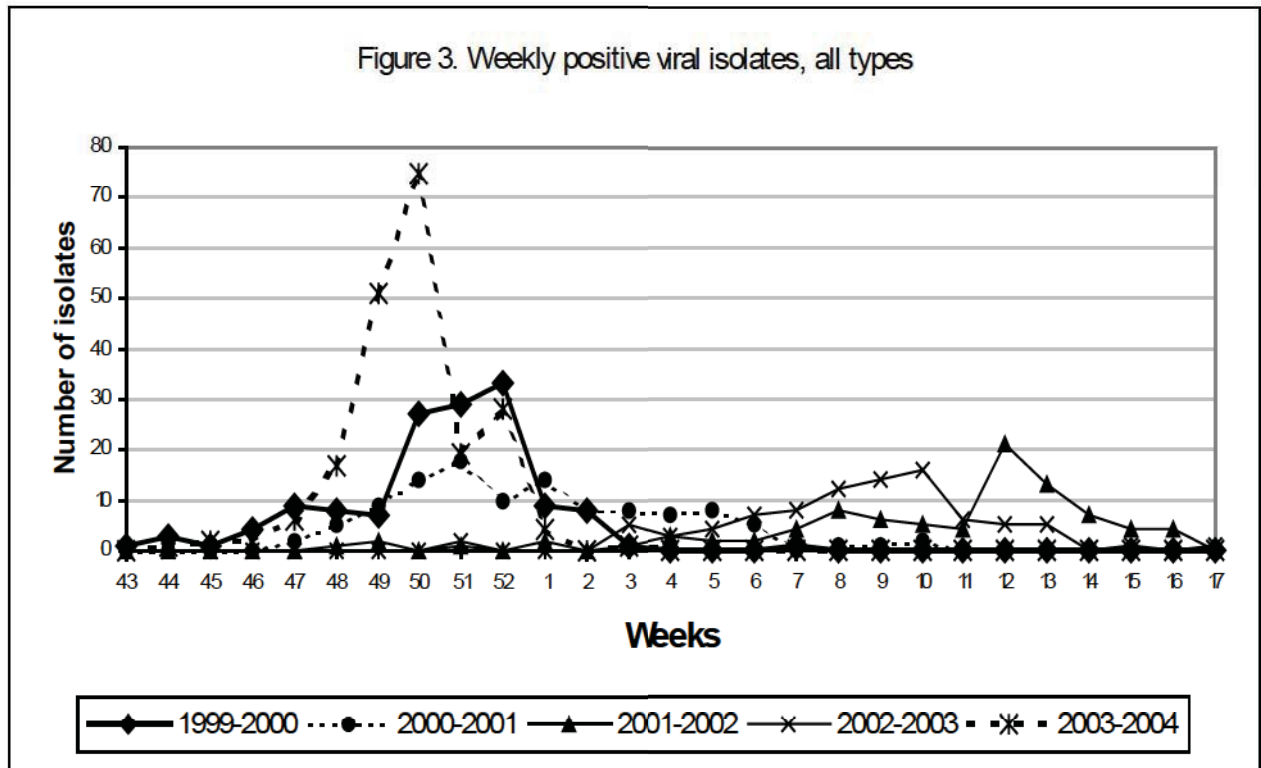
What occurred during 2003–2004 was unusual and also demonstrates the discord between the public's reaction to influenza versus ultimate impact of the 2003–2004 season. The number of positive isolates reported during the 2003–2004 season was substantially greater than any of the previous four seasons (Figure 3). In fact, the demand for testing was so overwhelming that during the peak of activity (week 51), testing from our primary contributing laboratory, Kaiser Permanente, was suspended due to a depletion of supplies. The number of positive isolates is also clearly greater than the last comparable type A season, 1999–2000.

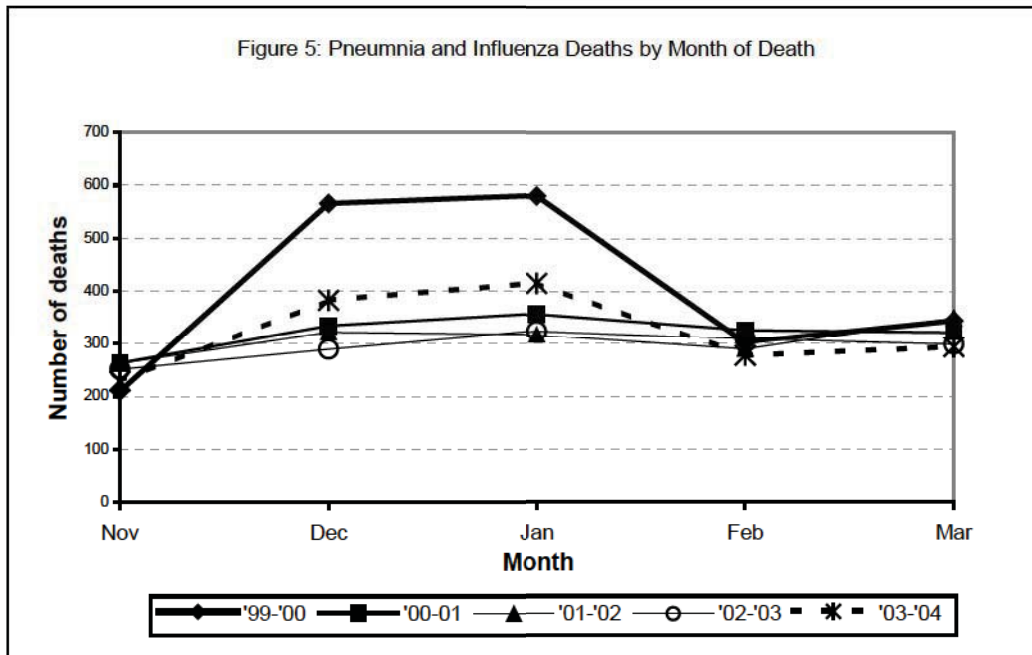
Based on the viral isolate findings alone, the 2003–2004 season appears to have been the most severe influenza season to hit our county in many years; however, the rates of influenza-related hospitalizations and deaths tell a different picture. Kaiser Permanente data aggregated from Southern California shows the 2003–2004 season resulted in *fewer* influenza-related hospitalizations than the comparable 1999–2000 season (Figure 4). Similarly, there were fewer deaths in LAC due to pneumonia and influenza<sup>2</sup> during the 2003–2004 season versus the 1999–2000 season (Figure 5).

2 When pneumonia and influenza is classified as underlying cause of death.



The discrepancy in these findings can be explained by anecdotal accounts describing the surge in patient visits during 2003–2004 as consisting of the “worried well”—clinics were overwhelmed by individuals who were especially anxious, but not necessarily especially ill. In other seasons, when





influenza did not garner the intense media attention that it did during late-2003, these individuals would have not have sought medical treatment.

Our county mortality data can also correct the prevailing misperception that the 2003–2004 season caused unprecedented numbers of influenza-related pediatric deaths (Table 1). Comparing the seasons, there were actually *fewer* pediatric deaths during 2003–2004 than the previous four seasons.<sup>3</sup> And more importantly, pediatric cases consistently contribute only slightly to the overall pneumonia and influenza mortality rate; across the past five years, more than 90% of all deaths resulting from pneumonia and influenza were among residents 65 years and older. This finding further demonstrates the overwhelming need to vaccinate the elderly in our county.

Table 1: Pneumonia and Influenza Deaths by Age-Group and Influenza Season\*

Age Group	Influenza Season									
	1999-2000		2000-2001		2001-2002		2002-2003		2003-2004	
	no.	%	no.	%	no.	%	no.	%	no.	%
<1	7	0.3	8	0.5	7	0.5	4	0.3	2	0.1
1-4	0	0.0	1	0.1	2	0.1	1	0.1	3	0.2
5-14	1	0.0	0	0.0	0	0.0	2	0.1	2	0.1
15-24	0	0.0	0	0.0	2	0.1	2	0.1	3	0.2
25-34	6	0.3	4	0.2	2	0.1	2	0.1	2	0.1
35-44	10	0.5	11	0.7	10	0.6	12	0.8	4	0.3
45-54	21	1.0	19	1.2	21	1.4	26	1.8	23	1.4
55-64	66	3.3	56	3.5	54	3.5	61	4.1	54	3.4
65-74	266	13.3	182	11.3	192	12.5	178	12.1	201	12.6
75-84	651	32.5	499	31.1	523	33.9	483	32.7	516	32.3
85+	978	48.8	825	51.4	729	47.3	705	47.8	790	49.4
TOTAL	2,006		1,605		1,542		1,476		1,600	

\* Seasonal frequencies; months November through March.

3 When pneumonia and influenza is classified as underlying cause of death.



## ENHANCED PEDIATRIC INFLUENZA SURVEILLANCE

In light of the reports of influenza-related pediatric deaths in Colorado mid-November 2003, the CDC responded with a special surveillance project; doctors and hospitals were asked to report influenza-associated pediatric deaths as well as pediatric intensive care cases with confirmed influenza infection, particularly cases of encephalopathy or encephalitis. Across California, 124 severe influenza cases were reported throughout the season including 8 deaths. Of these, many of the cases (n=48, 39%) including 3 deaths were reported from LAC.

Since this was the first year such a project was enacted, data from previous years are unavailable for comparison. Nonetheless, the findings provide some interesting information about pediatric influenza cases. Of note, about half of the California cases (n=67, 54%) and half of the LAC cases (n=24, 50%) fall into risk groups for which influenza vaccination is currently recommended by the CDC (e.g., age 6 to 23 months or possessing a chronic medical condition such as cardiac, pulmonary or endocrine disease or immunocompromised status). But more importantly, very few of these high-risk cases reported receiving influenza vaccination; only 12 (13%) of the high-risk California cases and 3 (13%) of the high-risk LAC cases reported influenza vaccination for the 2003–2004 season. Thus the vast majority of children cases in need of influenza immunity are not being vaccinated.

## IMMUNIZATION CHANGES FOR 2004–2005

As expected, the vaccine composition for the 2004–2005 season has been adapted to include the novel Fujian strain that was prevalent during 2003–2004. Also, because of heightened concern surrounding pediatric influenza cases, the National Immunization Program of the CDC implemented two important changes for the 2004–2005 season. First, recommendations for vaccination have been expanded to protect more people from influenza, including infants and children 6 to 23 months of age, as well as household contacts and out-of-home caregivers of children 0 to 23 months of age; the goal is to prevent these contacts from infecting young children with influenza.<sup>4</sup> Second, funding has been allotted to stockpile vaccine to ensure better access to vaccination for children 18 years and younger eligible for the Vaccine for Children program, an estimated 54% of children.<sup>5</sup>

## CONCLUSIONS

Once again, influenza continues to surprise. While 2003–2004 was expected to be more severe than the previous few years, the sudden change in public and media interest was astounding. This suggests that better public health communication campaigns are needed to alleviate public anxiety and thereby curb needless medical and emergency room visits that can easily overwhelm the system. Also surprising was the discord between the media's depiction and the public's perception of the season's severity versus the severity as indicated by empiric morbidity and mortality measures. While numerous individuals were ill this season, rates of hospitalizations and deaths were not comparable to the level of fear that was generated. It is unclear whether the dramatic surge in demand for vaccination prevented those at greatest need (i.e., the elderly and immunocompromised) from receiving vaccination, but the events of this season suggest that the ability to revise mid-season the strategies for vaccine distribution are as important as the strategies that are drafted at the beginning of each season. Finally, as demonstrated by this year's special pediatric surveillance project, it is alarming that very few children and infants who are at greatest risk for complications due to influenza are actually being vaccinated. Better awareness campaigns are needed to improve the pediatric vaccination rate.

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4 CDC. Prevention and control of influenza: Recommendations of the advisory committee on immunization practices (ACIP). *MMWR* 2004; 53:1–43. Available at: [www.cdc.gov/mmwr/pdf/rr/rr53e430.pdf](http://www.cdc.gov/mmwr/pdf/rr/rr53e430.pdf)

5 CDC. Influenza Vaccine Bulletin #2. May 20, 2004. Available at: [www.cdc.gov/nip/flu/bulletins-flu/2004-05/bulletin2\\_052004.htm](http://www.cdc.gov/nip/flu/bulletins-flu/2004-05/bulletin2_052004.htm)