



**COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC HEALTH  
IMMUNIZATION PROGRAM  
2007-2008 INFLUENZA CAMPAIGN REPORT  
AUGUST 2008**

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## **Background**

During the winter months of 1990-1999, influenza caused an average of 36,000 deaths in the United States each year.<sup>1</sup> During influenza epidemics, there is a twofold to fivefold increase in hospitalization rates in the elderly and persons with chronic medical conditions.<sup>2</sup> The elderly and very young children are at greater risk of serious illness and/or death. In 2003 influenza-related pediatric deaths became reportable in Los Angeles County (LAC). Since 2003 there has been at least one pediatric death and 22 pediatric intensive care cases occurring each influenza season, with as many as seven deaths reported during the 2005-2006 season and 48 intensive care cases during the 2003-2007 season (personal communication with the Los Angeles County Acute Communicable Diseases Control Program on July 22, 2008). On average, 5% to 20% of the United States population becomes sick with influenza each year.<sup>3</sup> The most effective way of preventing illness due to influenza is to get vaccinated.<sup>1</sup> To lessen the impact of influenza, the Advisory Committee on Immunization Practices (ACIP) recommends that persons at risk for complications due to influenza be vaccinated each year.<sup>1</sup> The California Health and Safety Code Section 104900 mandates that publicly funded vaccine be made available to these high-risk persons, with priority given to all persons 60 years of age and older.

### Vaccination Recommendations for the 2007-2008 Influenza Season

- ACIP recommendations<sup>1</sup>
  - Adults aged 50 years and older.
  - All children aged 6-59 months.
  - Residents of nursing homes and other chronic care facilities.
  - All persons with chronic health conditions (e.g. cardiovascular disease, asthma, pulmonary disease).
  - All persons who required regular medical follow-up or hospitalization during the preceding year because of chronic metabolic diseases, renal dysfunction, hemoglobinopathies, or immunosuppression.
  - Children and adolescents receiving long-term aspirin therapy.
  - Pregnant women in their second or third trimester.
  - Health-care workers.
  - Household contacts of persons in high risk groups.
  - Close contacts of children aged 0-59 months.
  
- LAC Department of Public Health (DPH) recommendations
  - All LAC-DPH recommendations for the 2007-2008 Influenza Campaign were the same as ACIP recommendations.

### Influenza Campaign

- Publicly funded influenza vaccine from the California Department of Public Health and vaccine purchased by LAC are distributed by the Los Angeles County Immunization Program (LACIP) to public clinics, community and free clinics, and private providers who agree to

hold public clinics. All other healthcare providers must purchase vaccine directly from the vaccine manufacturer for their patients and these data are not available.

- In addition to injectable vaccine, LAC distributed intranasal influenza vaccine. Intranasal vaccine is licensed for use only in healthy persons aged 2 to 49 years. The most notable use of the intranasal vaccine was for a school pilot project in which selected schools were provided with intranasal vaccine for administration to students, faculty, and staff.
- Participating healthcare providers immunize high-risk persons either in their clinics or during outreach programs (i.e., non-healthcare settings).
- Vaccine availability, the number of high-risk patients served by the provider, and the number of doses of vaccine used by the provider in previous years determine the amount of influenza vaccine each healthcare provider receives from LACIP.

## **Methods**

### Collected Data

- Vaccine accountability forms are distributed to each healthcare provider administering publicly funded vaccine in order to collect the following information:
  - Healthcare provider name and locating information.
  - Whether vaccine was administered at the in-house clinic or as an outreach activity.
  - Date of vaccine administration.
  - Age and ethnicity of vaccine recipient for every dose administered.
- Accountability forms have the healthcare provider's name pre-printed on them before distribution.
- Accountability forms are submitted weekly by in-house clinics; outreach clinics submit accountability forms at the conclusion of the clinic.

### Exclusion criteria

- The 2007-2008 Influenza Campaign began October 22, 2007. Providers continued to administer the influenza vaccine until the supply was depleted or the vaccine expired.
- Data for this report were collected through May 31, 2008.
- Accountability forms submitted by providers not directly supplied with vaccine by LACIP were excluded.

### Data Analysis

- Number of doses administered at the influenza clinics, by race/ethnicity and age of the recipients.
- Number of doses administered by type of provider: Community Health Provider (community and free clinics and other private providers who agree to hold public vaccine clinics), Personal Health Center, and Public Health Center.

- Number of doses administered in each Service Planning Area (SPA).

## Results

The results are grouped into three categories:

- I. Vaccine Administration – Overall Summary & Trends by Provider Type.
- II. Vaccine Administration – Demographic Stratified Summary & Trends.
- III. 2007-2008 Influenza Campaign Results.

### I. Vaccine Administration – Overall Summary & Trends by Provider Type.

**Table 1. Influenza Vaccine Doses Administered, by Provider Type, Los Angeles County, 2003-2007 Influenza Campaigns.**

Provider Type	Influenza Campaign Years									
	2003-2004		2004-2005		2005-2006		2006-2007		2007-2008	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Community Health Provider	30,331	(23.4)	20,199	(17.5)	43,215	(32.8)	41,038	(32.7)	53,189	(42.0)
Personal Health Center	15,555	(12.0)	1,698	(1.5)	8,496	(6.5)	10,614	(8.5)	5,821	(4.6)
Public Health Center <sup>2</sup>	65,260	(50.4)	68,685	(59.6)	75,659	(57.5)	70,288	(56.0)	67,517	(53.4)
Skilled Nursing Facility	18,285	(14.1)	20,499	(17.8)	0 <sup>3</sup>	(0)	0 <sup>3</sup>	(0)	0 <sup>3</sup>	(0)
Other <sup>4</sup>	0	(0)	4,235	(3.7)	4,260	(3.2)	3,639	(2.9)	0	(0)
<b>Total</b>	<b>129,431</b>	<b>(100)<sup>5</sup></b>	<b>115,316</b>	<b>(100)<sup>5</sup></b>	<b>131,630</b>	<b>(100)<sup>5</sup></b>	<b>125,579</b>	<b>(100)<sup>5</sup></b>	<b>126,527</b>	<b>(100)<sup>5</sup></b>

<sup>1</sup>Intranasal vaccine doses administered.

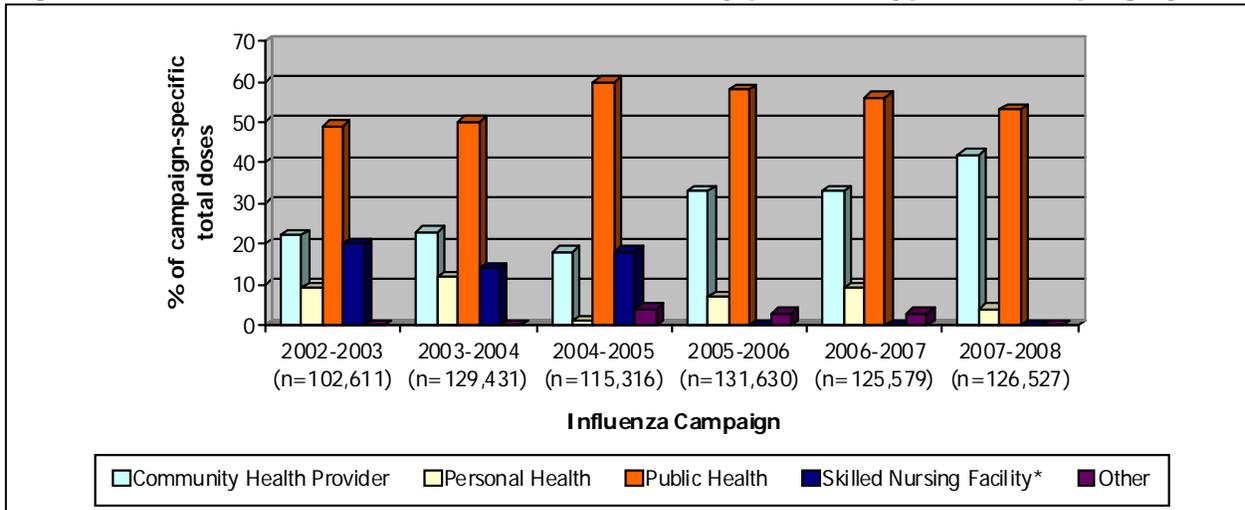
<sup>2</sup>Includes outreach clinics.

<sup>3</sup>Publicly-funded vaccine was no longer provided to skilled nursing facilities starting the 2005-2006 Influenza Campaign.

<sup>4</sup>Includes prisons, fire departments, rehabilitation centers, churches, hospitals, and other non-Los Angeles County Health agencies.

<sup>5</sup>Percentages may not add up to 100 due to rounding approximation.

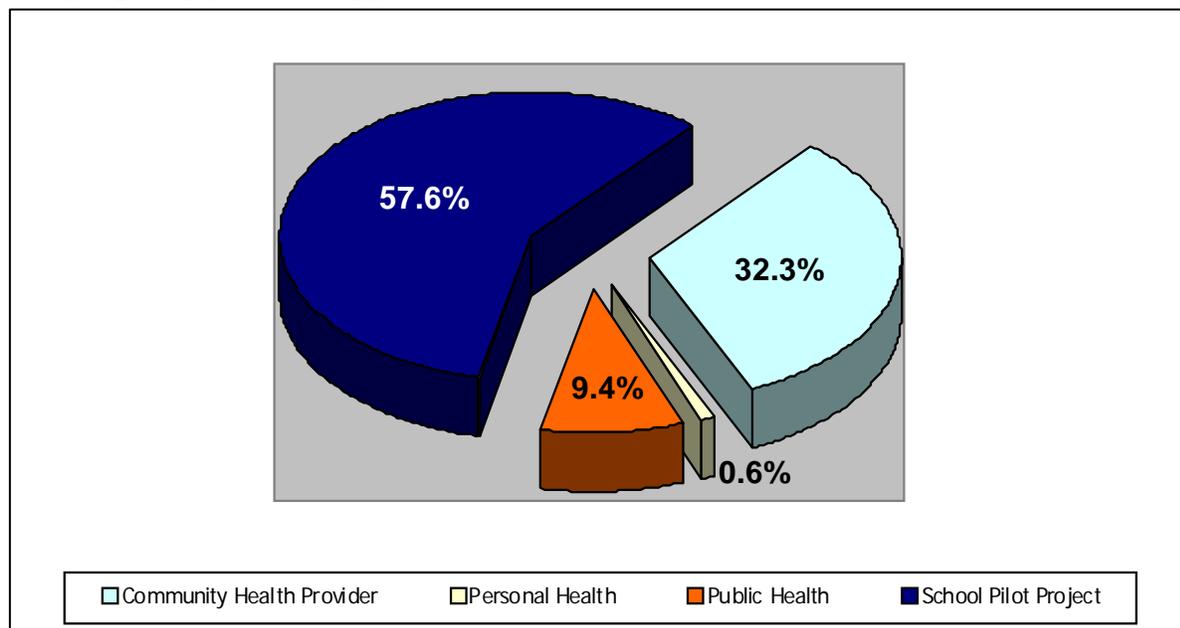
**Figure 1a. Administration of influenza vaccine, by provider type and campaign year.**



\*Publicly-funded vaccine was no longer provided to skilled nursing facilities starting the 2005-2006 Influenza Campaign.

There was little change in total doses administered during the 2007-2008 Influenza Campaign, compared to the 2006-2007 Influenza Campaign. Except for the 2003-2004 and 2004-2005 campaigns, the total number of doses administered during the 2007-2008 campaign does not differ much from the previous campaigns. In all six campaigns, Public Health providers administered the largest proportion of the vaccine (49%-60%). The increase in doses administered by Community Health providers is probably due to the intranasal vaccine doses administered during the school pilot project. Also, the increasing emphasis on administering pediatric vaccine may have played a role in the observed rise in the proportion administered by Community Health providers.

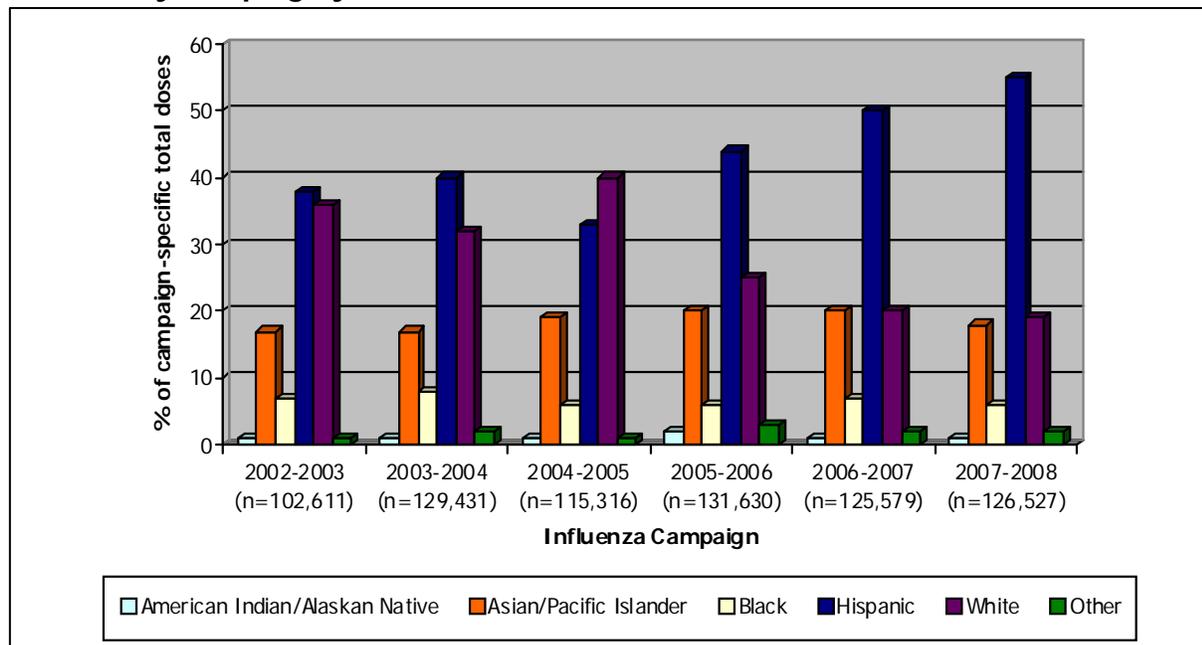
**Figure 1b. Administration of intranasal influenza vaccine during the 2007-2008 campaign, by provider type (n=6,332).**



Over 6,000 doses of intranasal vaccine were administered during the 2007-2008 influenza campaign. The majority of the intranasal vaccine was administered as part of a school pilot project in which selected schools were provided with intranasal vaccine to be administered to healthy school age children, faculty, and staff. Community Health providers administered the second highest proportion of intranasal vaccine doses.

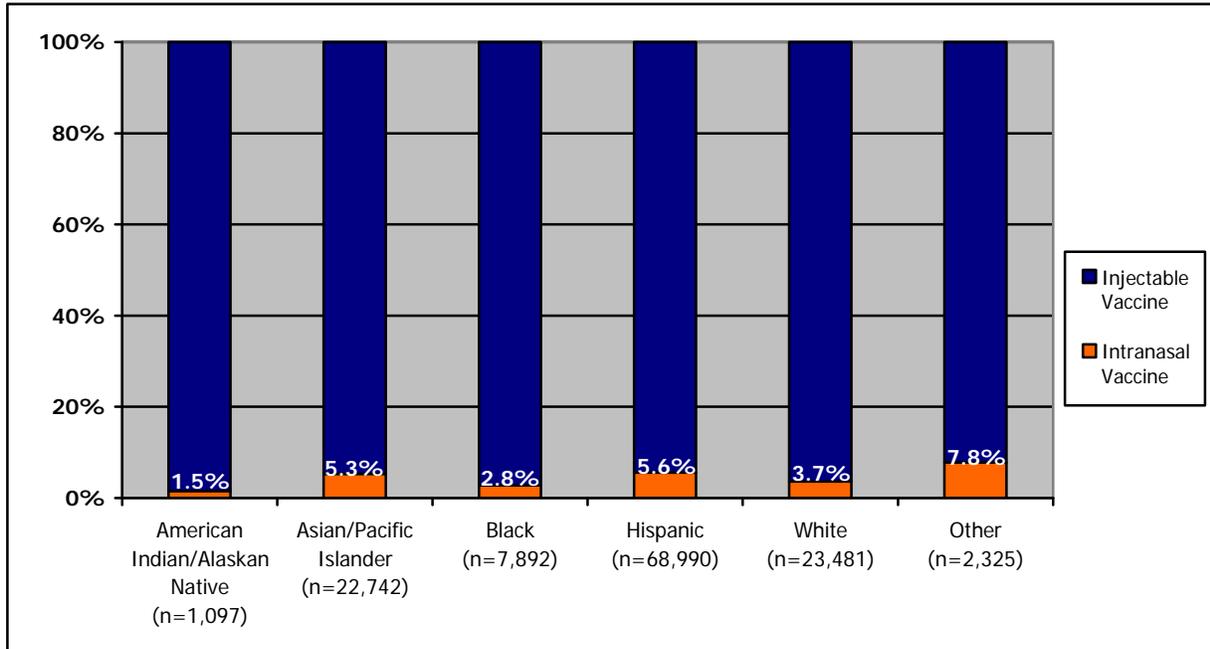
II. Vaccine Administration – Demographic Stratified Summary & Trends.

**Figure 2a. Ethnic distribution of persons receiving publicly funded influenza vaccine, by campaign year.**



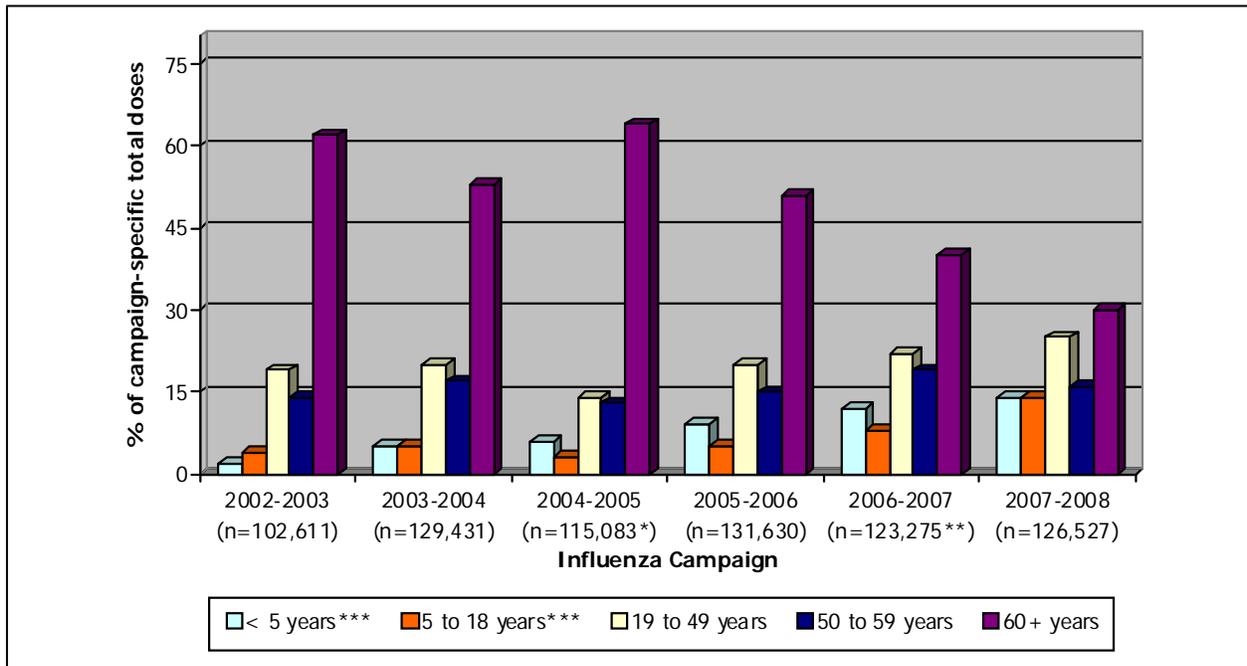
During the 2004-2005 Influenza Campaign, the largest proportion of the vaccine was administered to White clinic/outreach attendees (45,782 doses [40%]). During the 2004-2005 Influenza Campaign, a vaccine shortage resulted in the administration of vaccine targeting persons at high risk for serious illness or death due to influenza. Consequently, a greater number of persons aged 60 years and older were vaccinated. In 2004, Whites made up 49% of the elderly population in LAC, which explains why they accounted for the largest proportion of persons vaccinated in 2004-2005. During the 2002-2003, 2003-2004, 2005-2006, 2006-2007, and 2007-2008 campaigns, a larger proportion of the vaccine was administered to Hispanics (39,313 doses [38%], 52,181 doses [40%], 58,528 doses [44%], 61,204 [50%], and 68,990 [55%], respectively), compared to Whites (37,270 doses [36%], 41,039 doses [32%], 32,802 doses [25%], 24,213 [20%], and 23,481 [19%] respectively). Approximately the same proportions of influenza vaccine have been administered to Asian/Pacific Islanders (APIs) and Blacks in each campaign (16%-20% and 6%-8%, respectively).

**Figure 2b. Proportion of intranasal vs. injectable influenza vaccine administered during the 2007-2008 campaign, by race/ethnicity.**



Less than 10% of each racial/ethnic group received intranasal influenza vaccine. Nearly 8% of persons classified as 'other' received intranasal vaccine. Over 5% of APIs and Hispanics received intranasal vaccine. American Indian/Alaskan Natives (AI/ANs) had the lowest proportion of persons receiving the influenza vaccine (1.5%).

**Figure 3a. Age distribution of persons receiving publicly funded influenza vaccine, by campaign year.**



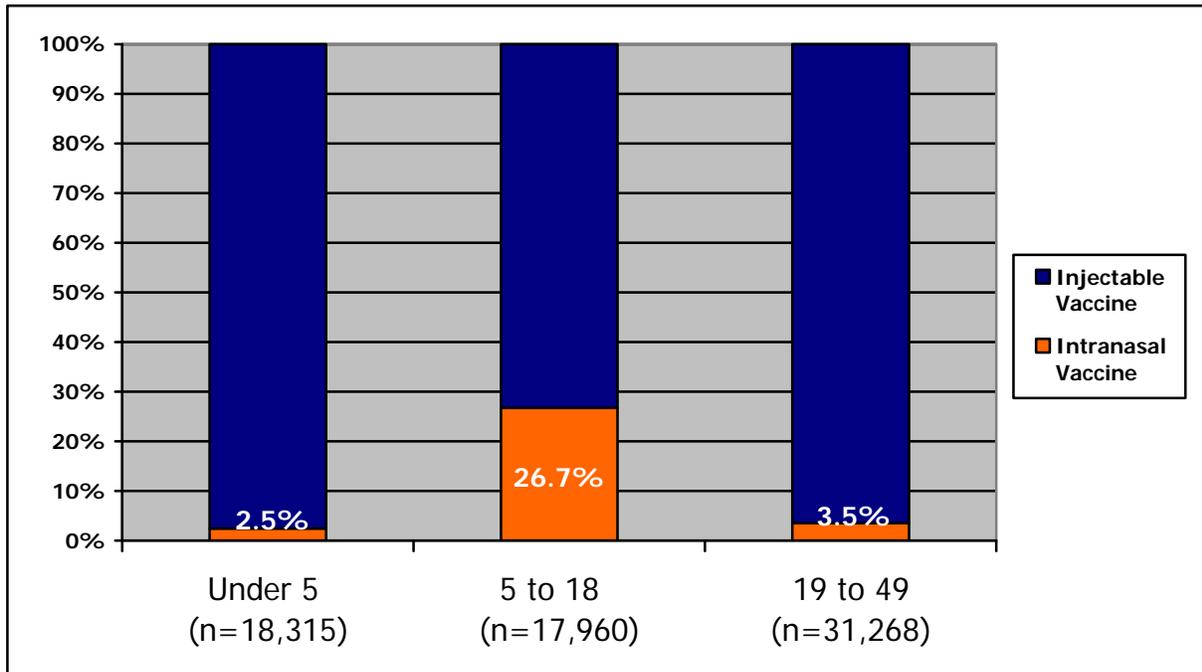
\*Due to the use of a previous campaign year's vaccine accountability form by 6 providers, the vaccine usage in persons aged 2-18 years for these providers cannot be separated into the appropriate age categories and were not included in this figure. These providers administered 233 doses of influenza vaccine to persons aged 2-18 years.

\*\*Because standard age categories were not collected by 3 providers, vaccine usage in persons aged 0-18 years for these providers cannot be separated into the appropriate age categories and were not included in this figure. These providers administered 2,304 doses of influenza vaccine to persons aged 0-18 years.

\*\*\*For the 2004-2005 and 2005-2006 influenza campaigns the "<5 years" category was changed to "<6 years" and the "5 to 18 year" category was changed to "6 to 18 years."

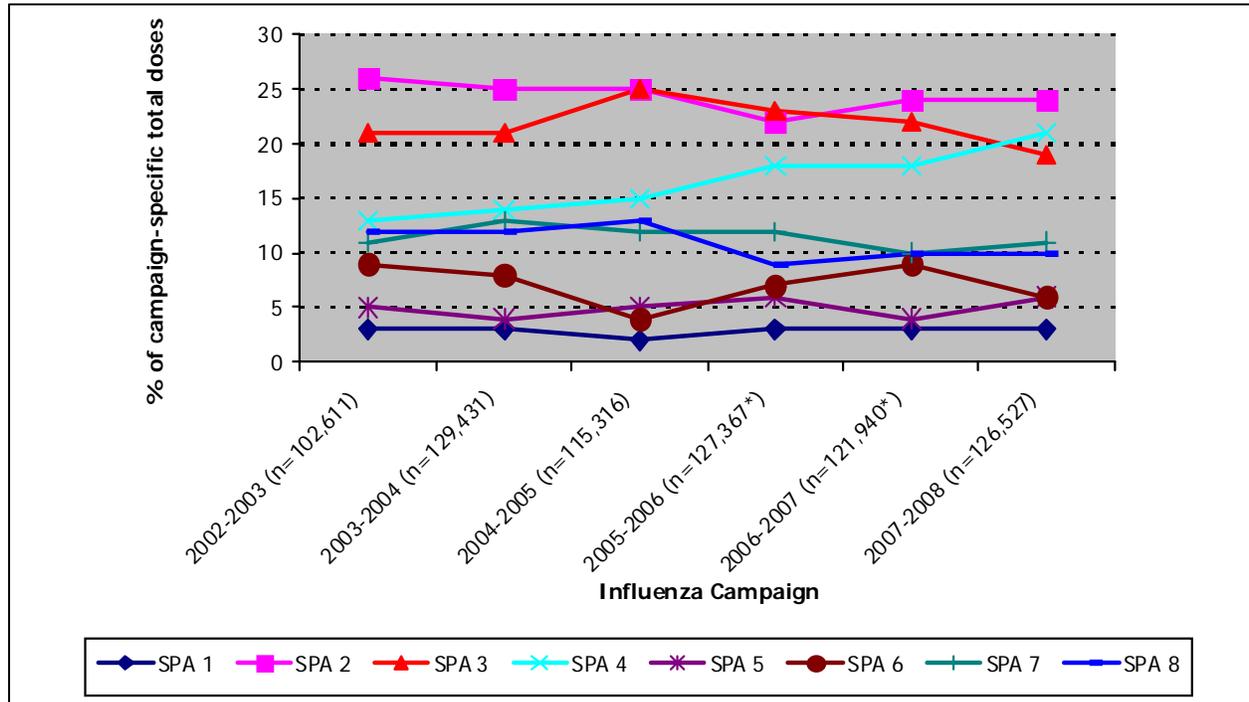
In all five campaigns, the majority of the vaccine was administered to persons 50 years of age and older, as recommended by ACIP. However, the proportion administered to persons 60 years of age and older has decreased each year, from 62% (63,892 doses) in the 2002-2003 campaign to 30% (38,213 doses) in the 2007-2008 campaign. The increase in the proportion of vaccine administered to persons aged 5 to 18 years was due to the school pilot project. The increase observed during the 2004-2005 campaign in the proportion of influenza vaccine administered to persons 60+ resulted from the modification of ACIP recommendations in response to a vaccine shortage.

**Figure 3b. Proportion of intranasal vs. injectable influenza vaccine administered during the 2007-2008 campaign, by age group.**



Intranasal influenza vaccine is licensed for use in persons aged 2 years to 49 years of age. Nearly 27% of persons in the 5 to 18 year age group received intranasal vaccine. Less than 5% of the other two age groups received intranasal vaccine. This disparity is due to the school pilot project, which is responsible for administering greater than 50% of the intranasal vaccine during the 2007-2008 campaign.

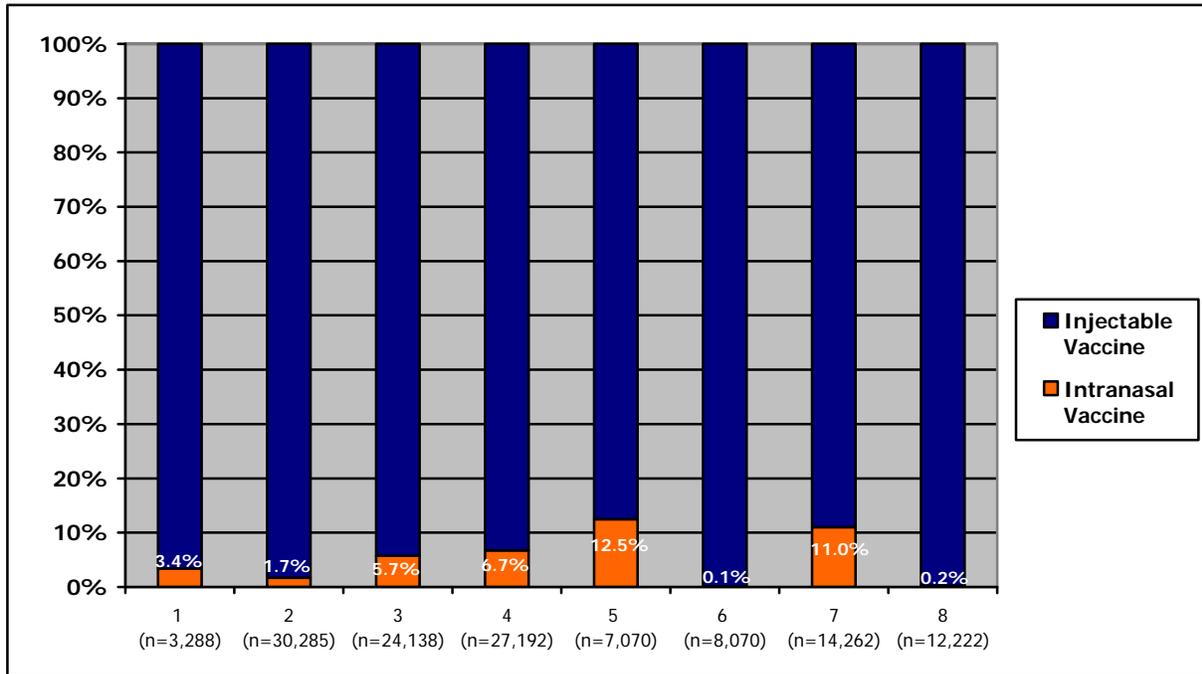
**Figure 4. Proportion of total influenza vaccine administered in each SPA, by campaign year.**



\*Total doses for 2005-2006 and 2006-2007 do not include non-Los Angeles County Health Departments.

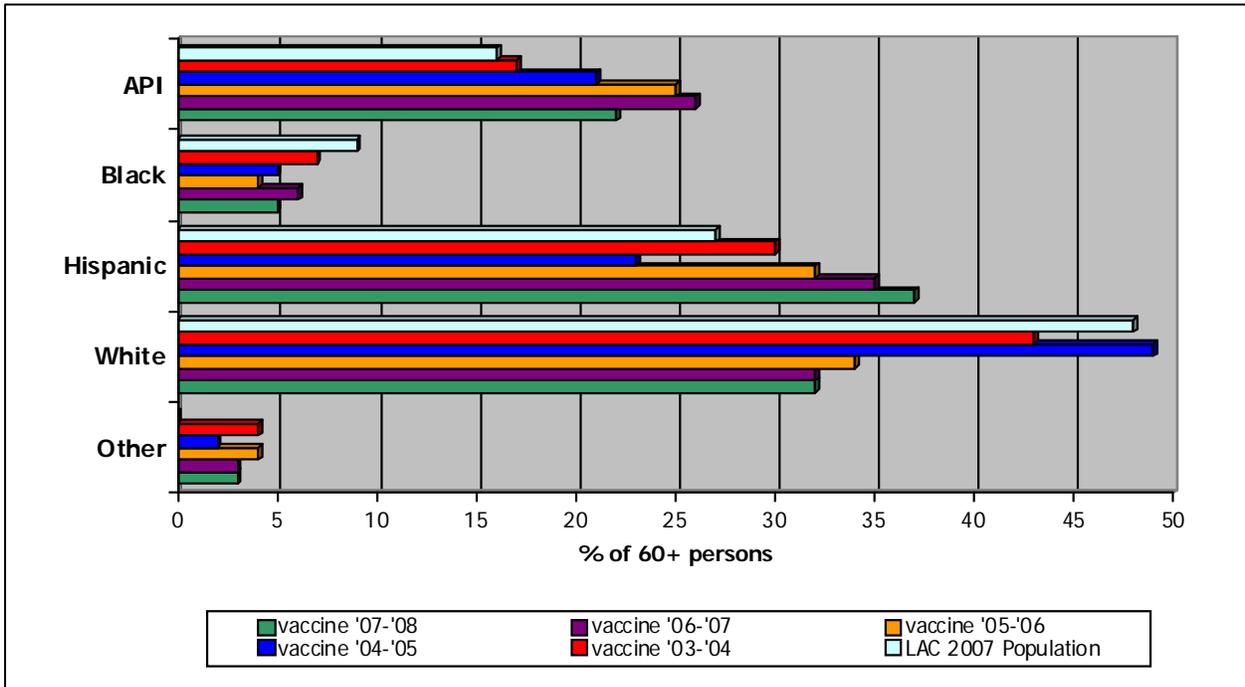
The amount of vaccine administered in each SPA is determined by the location of the provider administering the vaccine, not the residence of the vaccine recipients. For SPA 1 the proportion of the total influenza vaccine administered has remained approximately the same for each campaign year. SPAs 3 and 6 experienced decreases in their proportion of the total influenza vaccine administered during the 2007-2008 campaign compared to the 2006-2007 campaign (22% to 19% and 9% to 6%, respectively). SPAs 4, 5, and 7 experienced increases in their proportion of the total influenza vaccine administered during the 2007-2008 campaign compared to the 2006-2007 campaign (18% to 21%, 4% to 6%, and 10% to 11%, respectively). Increases in SPAs 5 and 7 were probably due to the school pilot project. There were no changes in SPAs 2 and 8 comparing the 2007-2008 campaign to the 2006-2007 campaign.

**Figure 4b. Proportion of intranasal vs. injectable influenza vaccine administered during the 2007-2008 campaign, by SPA.**



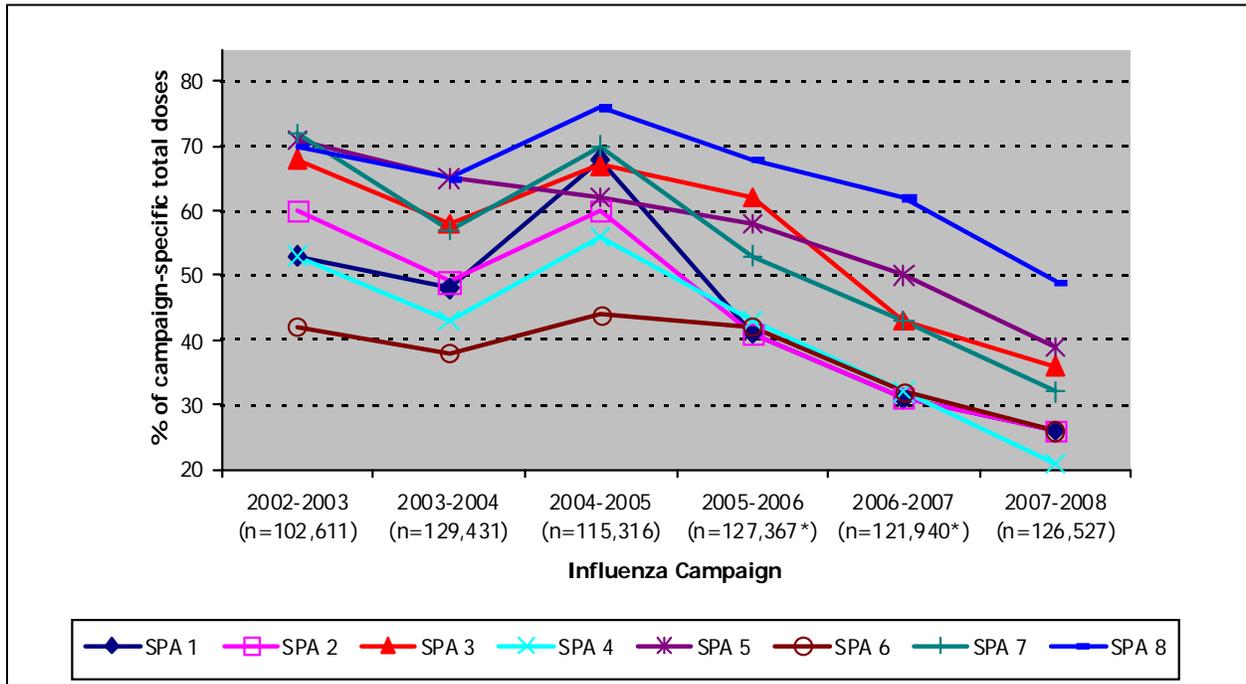
SPA 5 had the largest proportion of their vaccine recipients receiving intranasal vaccine (12.5%). SPAs 6 and 8 each had less than 1% of their vaccine recipients receiving intranasal vaccine. The relatively larger proportions of intranasal vaccine administered in SPAs 5 and 7 were primarily due to the school pilot project.

**Figure 5. Los Angeles County 60+ population and vaccine administered in persons 60 years and older, by race and campaign year.**



In persons 60 years of age or older, there was an increase in the proportion of vaccine administered to Hispanics (to 37% [14,276 doses]) in the 2007-2008 campaign compared to all past campaigns. However, slight decreases were observed in APIs (to 22% [8,551 doses]) and Blacks (to 5% [1,918 doses]). The racial distribution of vaccine administered to persons 60 years of age and older differed from the racial distribution of the 2007 LAC population.

**Figure 6. Percentage of total influenza vaccine administered to persons 60+ years, by SPA and campaign year.**

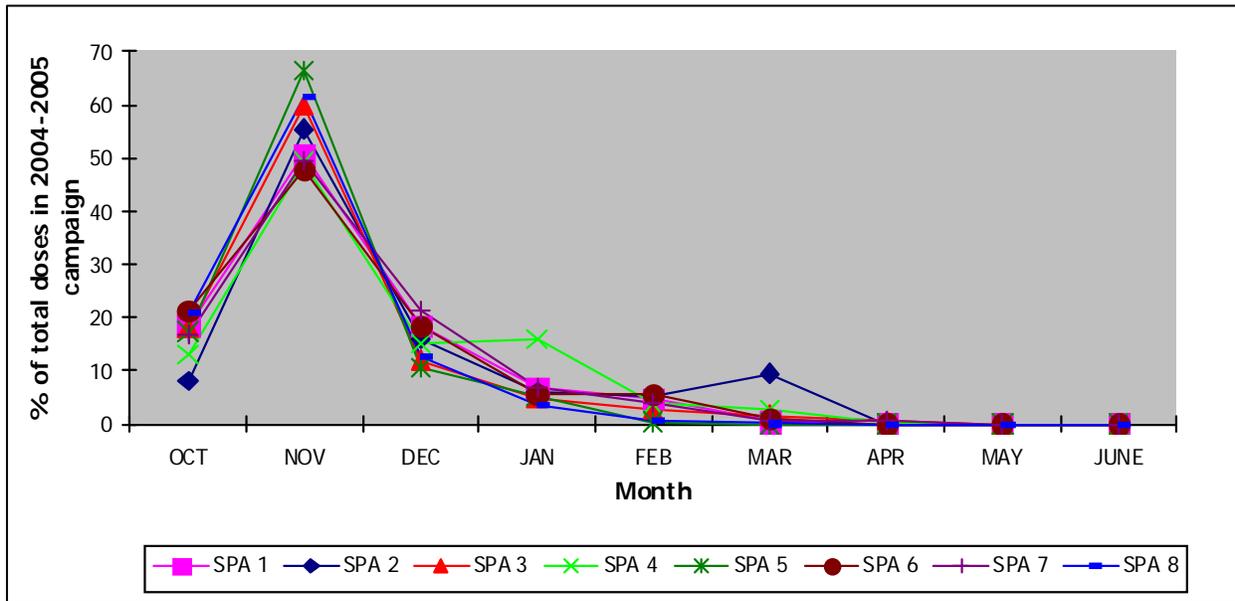


\*Total doses for 2005-2006 and 2006-2007 do not include non-Los Angeles County Health Departments.

Since the 2004-2005 campaign, the proportion of influenza vaccine distributed to persons 60+ has decreased in each SPA with each successive campaign. During the 2004-2005 campaign a vaccine shortage prompted a modification of ACIP recommendations, which explains the increase in the proportion of influenza vaccine administered to persons 60+ during that influenza campaign. The largest decrease during the 2007-2008 campaign occurred in SPA 8 (62% [7,483 doses] in the 2006-2007 campaign to 49% [5,977 doses] in the 2007-2008 campaign). However, SPAs 4, 5, and 7 also experienced large decreases (32% [6,991 doses] to 21% [5,611 doses], 50% [2,461 doses] to 39% [2,775 doses], and 43% [5,391 doses] to 32% [4,526 doses], respectively).

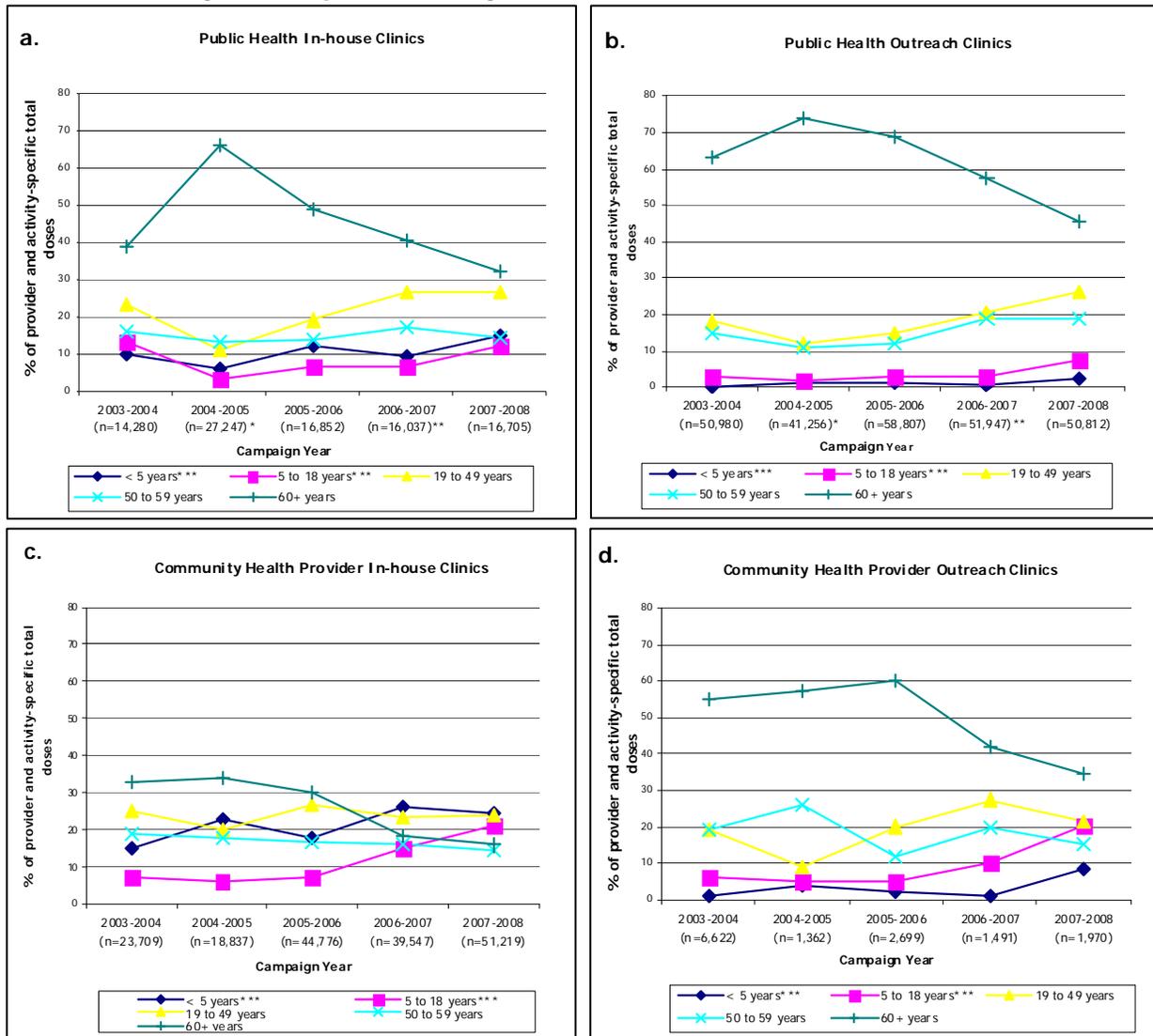
III. 2007-2008 Influenza Campaign Results

**Figure 7. Influenza vaccine administration each month, by SPA.**



During the 2007-2008 Campaign, all of the SPAs administered the largest proportion of vaccine doses in November. The majority of vaccine doses were administered during the first two months of the campaign. The majority of intranasal vaccine was also administered during the first two months of the campaign because a large proportion of this vaccine had a December expiration date.

**Figure 8. Age distribution of persons receiving influenza vaccine from public health and community health providers, by outreach and in-house clinics.**



\*Due to the use of a previous campaign year's vaccine accountability form by 4 providers, the vaccine usage in persons aged 2-18 years for these providers cannot be separated into the appropriate age categories and were not included in this graph. These providers administered 182 doses of influenza vaccine to persons aged 2-18 years. Of these 182 doses, 115 doses were administered during in-house clinics and 67 doses were administered during outreach clinics.

\*\*Because standard age categories were not collected by 3 providers, vaccine usage in persons aged 0-18 years for these providers cannot be separated into the appropriate age categories and were not included in this figure. These providers administered 2,304 doses of influenza vaccine to persons aged 0-18 years. Of these 2,304 doses, 1,253 doses were administered during in-house clinics and 1,051 doses were administered during outreach clinics.

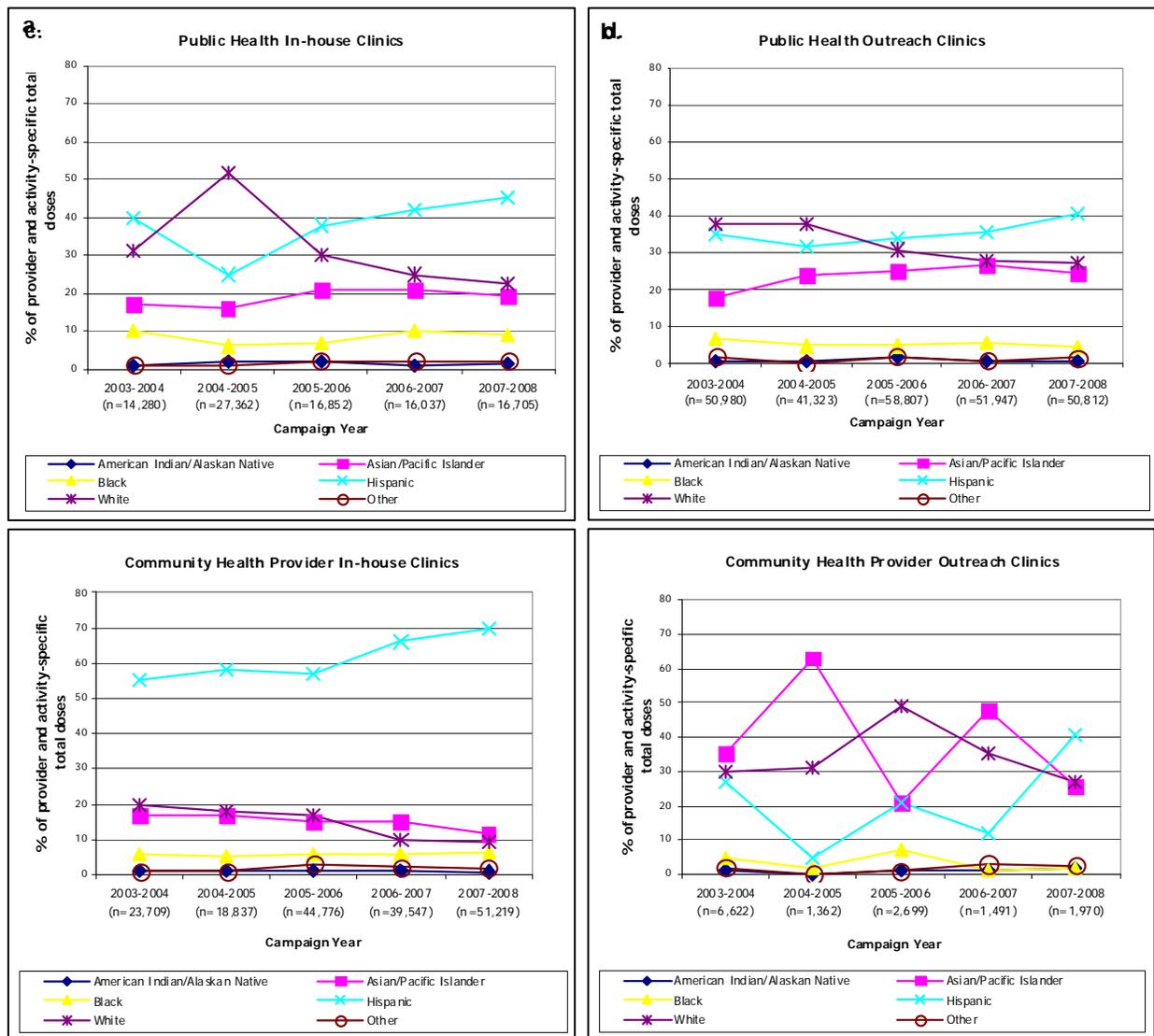
\*\*\*For the 2004-2005 and 2005-2006 influenza campaigns the "< 5 years" category was changed to "< 6 years" and the "5 to 18 year" category was changed to "6 to 18 years."

Public Health and Community Health outreach clinics administered 42% (52,782 doses) of the influenza vaccine provided during the 2007-2008 campaign (Figures 8b and 8d). Public Health in-house and outreach clinics (Figures 8a and 8b) and Community Health outreach clinics (Figure 8d) administered the largest proportion of their vaccine to persons 60 years of age or older (5,338 doses [32%], 23,008 doses [45%], and 684 doses [35%], respectively).

Community Health in-house clinics administered the largest proportion of their vaccine to persons 5 years of age or younger (12,481 doses [24%]) and persons age 19 to 49 years (12,350 [24%]), primarily because of the school pilot project.

When comparing the 2006-2007 and 2007-2008 campaigns, the age distribution of persons receiving vaccine in Public Health in-house clinics (Figure 8a) and Public Health outreach clinics (Figure 8b) remained the same. The age distribution of persons receiving vaccine during Community Health in-house clinics (Figure 8c) and Community Health outreach clinics (Figure 8d) changed slightly from the 2006-2007 campaign to the 2007-2008 campaign. There was a decrease in the proportion of vaccine administered to persons 60+ in all in-house and outreach clinics.

**Figure 9. Ethnic distribution of persons receiving influenza vaccine from public health and community health providers, by outreach and in-house clinics.**



Comparing the 2006-2007 and 2007-2008 campaigns, there was not much change in the ethnic distribution of persons receiving vaccine in Public Health in-house clinics (Figure 9a), Public

Health outreach clinics (Figure 9b), and Community Health in-house clinics (Figure 9c). The largest changes in ethnic distribution occurred in Community Health outreach clinics (Figure 9d). There was an increase in the proportion of Hispanics receiving influenza vaccine at all clinics, the largest increase occurring in Community Health outreach clinics (to 41% [20,703 doses]). Whites experienced a decrease in vaccine received during Public health in-house and Community Health outreach clinics, the largest decrease occurring in Community Health outreach clinics (to 27% [534 doses]). There was little change in the proportion of Blacks receiving vaccine in each clinic type. APIs experienced the largest decrease in the Community Health outreach clinics (to 26% [506 doses]).

During the 2007-2008 Campaign, Hispanic vaccine recipients made up a much larger proportion of the population receiving influenza vaccine at Community Health in-house clinics (70% [35,702 doses], Figure 9c) than the population receiving influenza vaccine at Public Health in-house clinics (45% [7,562 doses], Figure 9a). Predominantly Whites, Hispanics, and APIs received influenza vaccine at Public Health outreach clinics (14,015 doses [28%], 20,703 doses [41%], and 12,520 doses [25%], respectively), which was also the case in the Public Health in-house clinics (3,749 doses [22%], 7,562 doses [45%], and 3,259 doses [20%], respectively). The majority of persons receiving influenza vaccine at outreach clinics conducted by Community Health Providers were Hispanic (803 doses [41%]), which was new as compared to previous campaigns. Blacks and AI/ANs received the smallest proportions of vaccine administered during all outreach and in-house clinics.

Overall, Public Health Providers seemed to reach the same ethnic/racial groups in their outreach clinics as in their in-house clinics. In previous years Community Health Providers seemed to use their outreach clinics to target the ethnic/racial populations that do not attend their in-house clinics. However, during the 2007-2008 Campaign the ethnic/racial distribution in Community Health outreach clinics more closely resembled the ethnic/racial distribution in Community Health in-house clinics, especially compared to previous years.

## **Discussion**

### Summary

- Public Health outreach clinics administered the largest proportion of publicly-funded influenza vaccine to the LAC population over the last six campaigns.
- Over the past six influenza seasons, the age distributions of persons receiving publicly funded vaccine through the influenza campaign has been consistent. The majority of the vaccine was administered to persons 60 years of age and older. However, this percentage has been decreasing yearly in every SPA. During the 2007-2008 campaign the increase in the proportion administered to persons aged 5 to 18 years was primarily due to the school pilot project.
- According to the most recent LA Health Survey data, 71.3% of persons 65 years of age or older reported receiving the influenza vaccine in the last 12 months. The most recent LA Health Survey was administered to a sample of the LAC 2007 population. We are unable to estimate what proportion of these persons received publicly-funded vaccine.

- In each campaign, the majority of the influenza vaccine was administered to Whites and Hispanics and the smallest proportion to Blacks and AI/ANs. Part of the reason Blacks and AI/ANs receive a smaller proportion of the vaccine is that they make up the smallest proportions of the total LAC population (8.7% and 0.3%, respectively). However, special efforts to reach the AI/AN and Black communities are still needed. For the past few influenza campaigns APIs have been the third largest group to receive vaccine. However, APIs and Whites accounted for approximately the same proportion of persons receiving influenza vaccine during the 2006-2007 and 2007-2008 campaigns. The racial distributions of persons receiving publicly funded vaccine through the influenza campaign have been somewhat consistent over the past six influenza seasons.

### Limitations

- It is difficult to assess to what extent the annual influenza campaign reached its target population.
  - Age and race information is not maintained in the same manner at all clinic sites.
  - Information on chronic conditions is not currently collected. This makes it impossible to know whether the persons under 60 years of age receiving publicly-funded vaccine actually have a chronic condition listed in the ACIP recommendations.
- Information on vaccine usage during the influenza campaigns cannot be used to determine influenza vaccine coverage levels for LAC.
  - Currently, there are no reliable means for determining how many seniors or persons with chronic conditions receive non-publicly funded influenza vaccine from their primary medical doctor.

### **References**

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<sup>1</sup> Centers for Disease Control and Prevention. *Prevention and Control of Influenza. Recommendations From the Advisory Committee on Immunization Practices (ACIP), 2007.* MMWR 2007; 56(No. RR-6).

<sup>2</sup> Centers for Disease Control and Prevention. *Surveillance for Influenza - United States, 1994-95, 1995-96, and 1996-97 Seasons.* MMWR 2000; 49(No. SS-3): 13-28.

<sup>3</sup> Centers for Disease Control and Prevention. Influenza (Flu). Available at: <http://www.cdc.gov/flu/keyfacts.htm>. Last accessed 7/9/2008 at 12:13pm PDT.