Estimating Influenza Cases and Vaccinations By Means of Weekly Rapid Reporting System

Methodological considerations and results obtained in the U.S. Health Interview Survey

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A SMALL OUTBREAK OF INFLUENZA in February 1976 at Fort Dix, N. J., gained quick notoriety—the strain of the virus isolated was different from the more prevalent A-Victoria or B-Hong Kong varieties, and it was determined to be closely related to the virus that caused the 1918–19 pandemic. The new strain was labeled A/New Jersey-76 and called swine flu because the virus is commonly found in swine. Because most of the people in the United States were not immune to this virus, health officials believed that an epidemic could occur in the 1976–77 influenza season.

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For the first time in history, an influenza virus with the potential for causing an epidemic was isolated before widespread outbreaks occurred and in sufficient time for the manufacturing of sufficient quantities of vaccine to protect the population. Weighing the potential costs of a major epidemic in terms of illness and loss of life against the costs and risks of immunizing the population, in March 1976 officials of the Public Health Service recommended, and the President subsequently approved, a national influenza immunization program. In April 1976 the Congress appropriated $135 million to implement this program.

The Center for Disease Control (CDC) was charged with developing a comprehensive immunization delivery system with health agencies as well as with the private sector. CDC was also charged with the assessment of the coverage of the vaccination program, as well as the surveillance of influenza cases

and resulting deaths. To monitor swine flu vaccination coverage, CDC obtained weekly estimates for the entire United States and its possessions (including military and institutionalized populations). For swine flu surveillance, 50 collaborating laboratories of the World Health Organization reported weekly data, by post card directly to CDC, on the number of specimens submitted for isolation of influenza viruses and the number of isolates of A/New Jersey-like viruses. Also, the National Institute of Allergy and Infectious Diseases reported weekly the results of viral isolation tests from 12 laboratories throughout the United States.

To monitor the cases of influenza occurring throughout the country, CDC had four basic systems:
Institutional surveillance—selected schools and industries throughout the nation reported weekly absenteeism rates, and hospitals reported weekly emergency room or clinic visits for upper respiratory illness.
Physician reporting—34 States included influenza-like illness reported by physicians in morbidity reports to CDC.
Anecdotal reporting—State epidemiologists reported weekly to CDC estimates of influenza activity.
Mortality surveillance—vital statistics offices in 121 cities reported weekly total deaths due to pneumonia or influenza.

The Health Interview Survey

Missing from these influenza surveillance systems was a system through which national estimates could be made from a national probability sample or a full census. Although CDC's basic system could provide partial information for the entire country, they could not provide sufficient data for production of estimates that could be assessed for precision. CDC therefore requested the National Center for Health Statistics (NCHS) to collect influenza activity data in the Health Interview Survey (HIS).

In the Health Interview Survey, a probability sample of households representing the civilian, noninstitutionalized U.S. population is interviewed each week by trained personnel of the Bureau of the Census. Interviewing is done continually on a weekly sample of about 800 households. Each year since 1957, data have been collected on illness and disability, limitation of activity (days lost from work, school, and so on) due to illness, physician visits, dental visits, and hospitalizations. Respondents are asked to name the specific condition that restricted their activity or caused them to seek medical care. Using a checklist of specific chronic conditions, the interviewers also ask the respondents whether they currently have any of these conditions. Various supplements are included in the HIS each year to collect information on timely subjects such as health habits, diabetes, or personal health expenses.

In response to CDC's need, a supplemental set of questions on influenza and influenza vaccinations was added to the regular HIS interview questionnaire in the last week of September 1976. The questions concerned influenza incidence and symptoms, incidence of all types of influenza vaccinations and swine flu vaccinations, and where the vaccinations were obtained and the amount paid for them. This influenza supplement provides health data analysts and planners with extensive information on the correlates of influenza. Among the many areas that may be examined are the relationships among other health and demographic characteristics (obtained in the main interview) and influenza, as well as the effect of influenza symptoms on limitation of usual activity (such as work loss). Additionally, the characteristics of persons who obtained influenza vaccinations as opposed to those who did not and the timing of the vaccination in relation to the contraction of an upper respiratory illness may be studied.

In the regular HIS processing procedures, the time between the data collection and publication of the results is generally at least 1 year. Because of the demand for timely data on influenza cases and vaccinations, the HIS implemented a rapid reporting system in which estimates of influenza-like illnesses; bed days due to such illnesses; and all types of influenza, including swine flu, vaccinations were published weekly 3 weeks after the week for which the estimates were made and only 1 week after the data were collected.

The HIS sample is designed so that tabulations can be provided for each of four major geographic regions, for large metropolitan areas, and for urban and rural sectors of the United States. The sample is also designed so that households interviewed each week represent those in the target population and that the weekly samples are additive over time. A rapid reporting system was used one other time in the history of the HIS, and that was during the 1957–58 influenza epidemic. At that time, weekly reports also were issued.

The weekly reports for 1977 were continued through April, and the estimates presented were provisional. Final estimates will be published after several months of extensive data processing in which medical coding is completed and many error and consistency checks are made on the data. The HIS weekly estimates were not part of CDC's systems for

detecting early outbreaks of influenza. Because of the national scope of the data, local outbreaks of influenza-like illness possibly were undetected. However, when used in conjunction with other sources of information within the CDC surveillance system, the HIS data could confirm or deny early inferences regarding the spread of this disease and its impact.

Each week, after the interviewers completed their assignment of household interviews tor the week, they sent their questionnaires to the Bureau of the Census Regional Offices. At the regional offices the questionnaire supplements were quickly checked for inconsistencies and errors, and tallies were made of the number of influenza cases, bed days associated with the illness, total vaccinations, and swine flu vaccinations. These tallies were teletyped to NCHS in Rockville, Md., where they were aggregated, analyzed, and published. A quality control procedure was implemented in NCHS's data processing center in the Research Triangle Park (RTP) in North Carolina. After RTP received the questionnaires from the regional offices, independent tallies were made to verify the Bureau of the Census' teletyped tallies. Errors were corrected in the next weekly publication.

Measurement Problems

An early measurement problem faced by HIS planners was how to define influenza. All illnesses or disabilities reported to the HIS are those perceived by the household respondents; no medical examination of the respondent is performed by HIS personnel. If the respondent has seen a physician because of a condition, the interviewer asks what the physician called the condition: "Did he give it a medical name?" If the respondent has not seen a physician, then whatever the respondent calls the condition is later coded by medical coders according to the International Classification of Diseases, Adapted. In the case of many acute conditions, such as influenza-like illnesses, the respondent may not have seen a physician. Some respondents with symptoms of fever, runny nose, headache, muscle ache, or cough may report that they have "influenza." Other respondents with identical symptoms may call their illness a cold, a virus, or something else. Without a medical diagnosis by means of a blood test or throat swab it is impossible to determine whether a person has influenza, and, if so, what type.

In view of these definitional problems, the HIS adopted the following procedure. For purposes of the rapid reporting system, only those illnesses reported by the respondent as being either "flu," "influenza," or "grippe" were counted. (Grippe is a regional term that is synonymous with influenza.) Because of much disagreement—even among physicians—as to how to define influenza in terms of its symptoms, for each case reported, the respondent was asked the following questions:

1. When (name) had the flu did he (she) have a fever?
2. Did (name) have a headache, muscle ache, cough, sore throat or runny nose?
3. Did (name) have diarrhea?

In addition to those persons who reported having influenza or grippe, the three questions were also asked of persons who reported having a "virus" or "cold." In this way, analysts may compare the respondents' statements as to the name of their condition with those selected symptoms. For instance, some respondents may have believed that they had influenza, although they did not have a fever; for some purposes, the data analysts may choose to exclude such cases.

Another problem was that only those acute conditions that either required restricted activity (bed day or cut down on usual activities) or a physician visit are counted for purposes of publication. The rationale, based on extensive investigation, is that a condition for which a person takes no action such as missing work or seeking medical care has too little effect on the person's life to be a memorable event. Hence, there would be too much recall error in the statistics on all acute conditions based on a 2-week recall period. Therefore, the HIS limits its definition of an acute condition. In the rapid reporting system, time did not permit the deletion of those cases that did not cause respondents to restrict their activities or to see a physician. However, because of the structure of the questionnaire, few (roughly 1 or 2 percent) of these acute conditions are entered on the questionnaire by the interviewer. To investigate the characteristics of persons who did not limit their regular activities or see a physician when they believed they had influenza, the following was done. On the influenza supplement, those respondents who during the regular interview had not volunteered that they had influenza (in response to questions designed to elicit all acute conditions requiring cut down of activity or medical attention) were asked: "During the past 2 weeks did you have the flu (influenza) or grippe?" Those respondents who answered "yes" were asked the three symptom questions.

The HIS questionnaire contains a set of core items (on acute and chronic conditions, use of medical services, and socioeconomic information), which remain essentially unchanged from year to year until

the survey undergoes a thorough evaluation once every 10 years. As mentioned earlier, each year supplemental topics are included such as, in 1977, questions on disabilities, health habits, and hearing loss. Questionnaire designers know, as it has been well documented, that changing question wording or question order can change the answers of respondents. Therefore, where possible, the same core questions are kept each year so that trend estimates may be made. The HIS has been confronted, however, with the problem of the effects that supplements may have on the core items. For instance, a supplement on acute conditions was included in 1973–74. During that time, the incidence of acute conditions in the population dropped dramatically. It is believed that acute conditions did not really drop to such an extent, but rather that the introduction of the supplement biased the estimates.

Because the HIS planners feared that the introduction of an influenza supplement might bias the regular estimates of upper respiratory conditions, several precautions were taken. First, the supplement was designed so that one had to be filled out for every person in the HIS sample (not just for persons who had had influenza). This procedure, it is hoped, ameliorated the problem of some interviewers not picking up influenza cases in the body of the main interview so that they would not have to ask additional questions of the respondents. Another technique to reduce the potential bias was to include bronchitis among the conditions that had to be carried over from the main questionnaire to the supplement. Although the data analysts will not be concerned with bronchitis, since it is not considered an upper respiratory condition, if the estimates of bronchitis differ substantially from previous years this will provide evidence that the supplement may have introduced a bias into the data.

In the beginning stages of planning for the influenza supplement it was believed that only a handful of people would receive more than one type of vaccination. For those who were to receive more than one type, the HIS planners were told that it was "good medical practice" to administer the swine flu vaccine first. For this reason, we designed the supplement questions on vaccinations to pick up information only about the first one received. We were not concerned about multiple swine flu vaccinations since each one contained an equivalent dosage (except for babies). Several weeks into the program we discovered that it was possible for a person to receive a B-Hong Kong or A/Victoria vaccine first and then to later receive swine flu vaccine. With hindsight we would have asked questions about each type of vaccine received.

We do not think that the accuracy of our estimates of persons who received a swine flu vaccination will be seriously affected by the way our questions were structured because the availability of B/Hong Kong and A/Victoria vaccine was limited.

On December 17, 1976, the swine flu vaccination program was suspended because of an outbreak of a type of paralysis called Guillian-Barré syndrome, which may have been associated with the vaccination. Although the program was recontinued on February 7, 1977, it was very limited. We continued to collect influenza information in the HIS after the program was suspended, but few vaccinations of any type were reported. Hence, in the HIS weekly reports in the rapid reporting system we stopped reporting vaccinations after the week ending December 19, 1976.

Statistical Methods

Two estimators were considered for estimating the weekly number of cases, the number of bed days due to influenza, and the number of all types of influenza vaccinations. Much of the developmental work is patterned after that of Walt Simmons, formerly Assistant Director for Research and Scientific Development, NCHS, now with WESTAT, Inc., Rockville, Md., who was responsible for the weekly estimation procedure during the 1957–58 influenza epidemic.

Because the HIS uses a 2-week reference period to collect data on the incidence of acute conditions, a 2-week reference period was also chosen for the influenza supplement. That is, during each week of interviewing a case is enumerated if its onset occurred during the 2 weeks preceding the interview week, a bed day is enumerated if it occurred during the 2 weeks before the interview week, and a vaccination is enumerated if it was received in the 2 weeks before the interview week. Thus, for any week i of interest the following two independent estimates can be made for the number of influenza cases, bed days, or vaccinations.

α_i—the estimate for "last week" obtained from interview week $(i + 1)$ and,

β_i—the estimate for "week before" obtained from interview week $(i + 2)$.

The first estimator considered was used during the 1957–58 influenza epidemic to estimate the incidence of acute upper respiratory conditions and is given by

$$X_{1i} = \tfrac{1}{2}(\alpha_i + \beta_i)$$

A second alternative estimator is given by

$$X_{2i} = \tfrac{1}{4}(\beta_{i-1} + \alpha_i + \beta_i + \alpha_{i+1}) = \tfrac{1}{2}(U_i + U_{i+1})$$

where $U_i = \frac{1}{2}(\beta_{i-1} + \alpha_i)$ is the average weekly estimate obtained from interview week $(i + 1)$. The estimator X_{2i} is a weighted average of four weekly estimates obtained from interview weeks $(i + 1)$ and $(i + 2)$ and since the estimator contains information from the week on either side of the week i of interest a smoothing effect results.

Although the estimator X_{2i} is statistically "biased," its variance is smaller than the variance of X_{1i}. In most situations (especially if a linear trend is present) the bias of X_{2i} will be small. Another important advantage of the estimator X_{2i} is that it can be formed by use of the 2-week average estimates U_i *and* U_{i+1} and does not require the formation of two separate weekly estimates for each week of interviewing. Operationally, this feature reduces the number of weekly tabulations in half. For these reasons the estimator X_{2i} was selected for making the weekly estimates.

The weekly estimates from the HIS can also be summed to form aggregates so that for N weeks

$$X_{2S} = X_{21} + X_{22} + \ldots\ldots + X_{2N}.$$

If the variance of X_{2i} remains constant over the N weeks, the variance of X_{2S} is equal to $(2N - 1)$ times the variance of X_{2i}.

Three methods were used to approximate the sampling variance of X_{2i} and the results were comparable for all three. The weekly estimates vary, but one relative standard error (a standard error divided by the estimate) for the number of influenza cases in a week is about 16 percent. One relative standard error for the weekly number of bed days, the average weekly number of persons in bed each day, and the number of vaccinations per week is about 20 percent. The relative standard errors for the cumulative total of weekly estimates will be smaller than the individual relative standard errors and are approximately $28/\sqrt{N}$ percent for N greater than or equal to 2 where N is the number of weeks accumulated. Estimates of change from one week to the next are subject to much larger relative sampling errors and should be used cautiously.

All estimates of relative standard errors will be slightly higher for the smaller weekly estimates and slightly lower for the larger weekly estimates. For influenza cases, the following estimates of relative standard error (in percentages) can be used.

Size of estimate (in thousands)	*Percent relative standard error*
1,500	20
2,000	17
2,500	15
3,000	13
4,000	11
5,000	10
6,000	9

Operationally, the first step in the weekly estimation procedure is to calculate the U_is. This is done by weighting the weekly sample data. Except for minor adjustments due to nonresponse and subsampling, the HIS sample is self-weighting (each sample person has the same probability of selection into the national sample). For production of the weekly estimates, each sample person was assigned the same probability of selection. One final post-stratification adjustment is required, however, to adjust each week's sample to the same national population. Since each week's sample is a random one, the distribution of sample persons will vary from week to week by age and race and an adjustment to the population distribution will improve the precision of the weekly estimates. The population distribution is obtained from the Bureau of Census, and adjustments are made each week for 10 age-race groups. If

y_{jk} = total number of sample persons in the jk^{th} age-race cell reported during the interview week $(i + i)$,

z_{jk} = total number of influenza cases, bed days, or vaccinations in the jk^{th} age-race cell reported during the interview week $(i + 1)$, and

Y_{yk} = population control (Bureau of the Census value) for the jk^{th} age-race cell for week i,

then the average weekly estimate U_i obtained from the interview week $(i + 1)$ is given by

$$U_i = \frac{1}{2}\left(\sum_{jk} z_{jk}\, Y_{jk}/y_{jk}\right)$$

The U_is are then used to calculate the X_{2i}s and their sampling errors.

To produce stable estimates for the individual age and race subdomains at least 3 months' data must be aggregated. The relative standard errors for the subdomain statistics are shown in parentheses in tables 1 and 2. The standard error is primarily a measure of sampling variability. As in any survey, the results are also subject to nonsampling errors such as errors due to processing and nonresponse. To the extent possible these types of errors are kept to a minimum by methods built into the survey procedures. The overall response rate for the survey is more than 96 percent.

Results of the Rapid Reporting System

A total of 72,603,000 cases of influenza-like illness severe enough to cause either restricted activity or to require medical attention were reported for September 20, 1976, through April 17, 1977 (table 1). This figure is lower than the one for the 1975–76 influenza season, when 92,160,000 cases were reported.

The rate of influenza-like illness was higher for white persons than for other persons; 36.1 cases per

100 persons were reported for white persons and 22.7 cases per 100 persons other than white.

The rate of influenza-like illness also varied by age; the highest rate of 41.4 cases per 100 persons was reported for the age group 0–17 and the lowest rate of 13.2 cases per 100 persons was reported for persons 65 and over. The lower rate for persons 65 and over is consistent with results from previous years.

The total number of bed days associated with influenza-like illnesses was 159,176,000. This figure is lower than the one for the 1975–76 influenza season, when 237,506,000 bed days were reported. A higher rate of bed days was reported for white persons for September 20, 1976, to April 17, 1977, than for persons other than white. The rate of bed days per 100 persons age 65 and over was lower than it had been for the past 6 years; however, as noted in table 1, the estimate for the influenza season is unreliable. The rate of bed days for other age groups for September 20 to April 17 ranged from 56.8 days per 100 persons 18–24 years old to 97.8 days per 100 persons under 18 years old.

The individual weekly estimates of influenza-like illnesses are shown in figure 1, and the weekly estimates of the average number of persons in bed each day because of such illnesses are shown in figure 2.

Table 1. Estimates of influenza-like illnesses and bed days associated with such illness, by age and color, United States, Sept. 20, 1976–April 17, 1977

Age group (years) and color	Cases		Bed days associated with illness	
	Number in thousands	Number per 100 persons	Number in thousands	Number per 100 persons
0–17	26,660(5)	41.4	63,084(8)	97.8
18–24	9,823(6)	36.4	15,348(6)	56.8
25–44	20,608(8)	37.8	41,326(6)	75.7
45–64	12,594(10)	29.1	30,750(8)	71.0
65 and over	2,918(12)	13.2	[1] 8,668(33)	[1] 39.3
White	66,237(5)	36.1	142,848(6)	77.9
All other	6,366(9)	22.7	16,328(27)	58.3
Total	72,603(4)	34.3	159,176(5)	75.3

[1] Figure does not meet NCHS's customary standards of reliability and precision (relative standard error exceeds 30 percent).

NOTE: Percent relative standard errors are shown in parentheses beside each estimate.

Table 2. Estimates of all types of influenza vaccinations and swine flu vaccinations, by age and color, United States, Sept. 20, 1976–Dec. 19, 1976

Age group (years) and color	All types		Swine flu	
	Number in thousands	Percent of population	Number in thousands	Percent of population
0–17	[1] 1,066(41)	[1] 1.6	[1] 397(42)	[1] 0.6
18–24	5,212(19)	19.3	4,681(17)	17.4
25–44	16,622(10)	30.6	15,856(11)	29.2
45–64	14,782(12)	34.1	13,127(13)	30.3
65 and over	8,775(9)	39.9	6,514(13)	29.6
White	43,859(9)	23.9	38,739(11)	21.1
All other	2,598(17)	9.3	1,836(23)	6.6
Total	46,457(9)	22.0	40,575(11)	19.2

[1] Figure does not meet NCHS's customary standards of reliability and precision (relative standard error exceeds 30 percent).

NOTE: Percent relative standard errors are shown in parentheses beside each estimate.

Figure 1. Weekly estimates of influenza-like illnesses in the United States

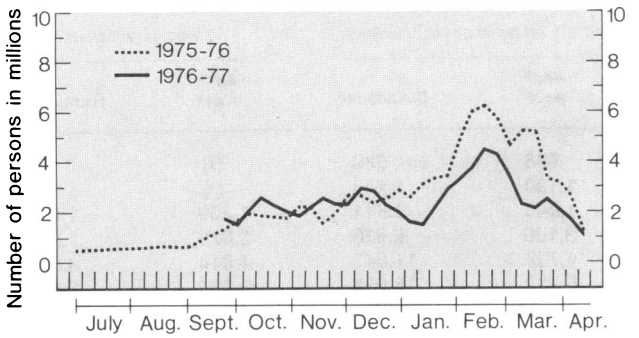
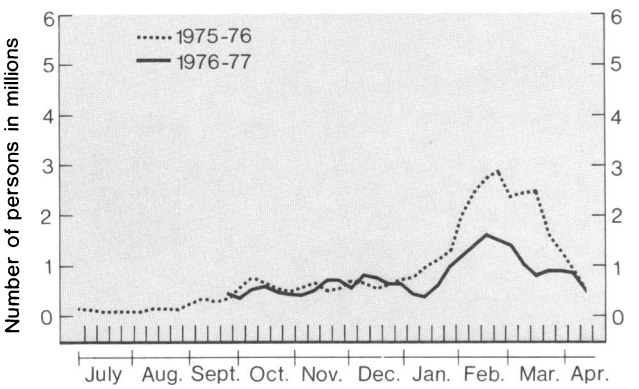


Figure 2. Weekly estimates of average number of persons in bed each day because of influenza-like illness in the United States



The average number of persons in bed each day is the total number of bed days in a given week associated with the illnesses divided by seven. A bed day is that in which a person stays in bed all or most of the day (more than half of the daylight hours). The estimates for influenza-like illnesses and bed days for the 1975–76 influenza seasons were not intended to be a norm on which to base expectations for the 1976–77 seasons. Rather, they were intended for comparison purposes only. However, the levels for 1975–76 were fairly typical of the past several years. The weekly estimates for cases and bed days peaked in mid-February, which was almost the same as the year before; however, the peak estimates were considerably lower for 1976–77 than for 1975–76.

As stated earlier, the swine flu immunization program was suspended on December 17 and, although it was recontinued in February, a negligible number of persons reported receiving a vaccination after the week ending December 19.

From September 20 to December 19, 1976, a much higher proportion of white persons reported receiving vaccinations than other persons (table 2). Among white persons, 23.9 percent reported receiving at least one type of vaccine versus only 9.3 percent of other persons; 21.1 percent of whites reported receiving swine flu vaccine versus 6.6 percent of others for the 18-week period.

The total number of all types of influenza vaccinations received during September 20 to December 19 is 46,457,000, and the estimate of swine flu vaccinations received is 40,575,000. The Center for Disease Control estimates that 42,109,094 doses of swine flu vaccine were administered during that time. The CDC estimate includes the military and institutionalized populations, whereas the HIS estimate is for the civilian, noninstitutionalized population.

Swine flu vaccination for persons aged 3–17 years was not formally recommended until November 1976. Hence, only a small number in this age group were vaccinated. Among other age groups, 17.4 percent of those 18–24 years received swine flu vaccine before December 19, and approximately 30 percent of the persons in the three oldest age groups received it by the week ending December 19. In October, persons 65 and over received swine flu vaccine at a much higher rate than those in other age groups because of the initial emphasis on the elderly and high-risk persons, while in November and December persons between 25 and 64 years old received it at a higher rate. Table 3 shows the weekly estimates of all types of vaccinations received; 87 percent of these were for swine flu. The number of vaccinations received per week peaked during the seventh week that swine flu vaccinations were administered. The table also shows the actual numbers for the weekly estimates of influenza-like illness, average number of persons in bed each day, and vaccinations.

Comment

On April 6, 1977, Joseph A. Califano, Jr., Secretary of the Department, of Health, Education, and Welfare, addressed the second National Immunization Conference in Bethesda, Md. He announced the initiation of a mass vaccination program for the nation's school-age children to begin in the fall. With the implementation of this program, there again will be a need for monitoring and surveillance. The National Center for Health Statistics expects to work with the Center for Disease Control in this endeavor. However, the plans for the reporting systems have not yet been worked out.

Table 3. Weekly estimates of influenza-like illnesses, average number of persons in bed each day, and influenza vaccinations, United States, 1976–77 (numbers in thousands)

Week and year	Cases	Average number of persons in bed each day	All types of vaccinations		Swine flu vaccinations	
			Each week	Cumulative	Each week	Cumulative
Sept. 20–26, 1976	1,710	419	638	638	(1)	(1)
Sept. 27–Oct. 3, 1976	1,490	369	1,130	1,768	(1)	(1)
Oct. 4–10, 1976	2,115	517	1,846	3,614	1,200	1,668
Oct. 11–17, 1976	2,567	591	3,196	6,810	2,378	4,046
Oct. 18–24, 1976	2,239	489	4,737	11,547	4,014	8,060
Oct. 25–31, 1976	2,062	413	5,122	16,669	4,634	12,694
Nov. 1–7, 1976	1,880	410	5,580	22,249	5,019	17,713
Nov. 8–14, 1976	2,319	511	6,749	28,998	6,391	24,104
Nov. 15–21, 1976	2,493	704	5,379	34,377	5,154	29,258
Nov. 22–28, 1976	2,277	700	4,101	38,478	3,921	33,179
Nov. 29–Dec. 5, 1976	2,276	573	4,128	42,606	3,972	37,151
Dec. 6–12, 1976	2,857	789	2,616	45,222	2,361	39,512
Dec. 13–19, 1976	2,831	753	1,235	46,457	1,063	40,576
Dec. 20–26, 1976	2,207	631				
Dec. 27, 1976–Jan. 2, 1977	2,033	657				
Jan. 3–9, 1977	1,656	486				
Jan. 10–16, 1977	1,457	411				
Jan. 17–23, 1977	2,127	562				
Jan. 24–30, 1977	2,938	945				
Jan. 31–Feb. 6, 1977	3,242	1,205				
Feb. 7–13, 1977	3,766	1,381				
Feb. 14–20, 1977	4,540	1,597				
Feb. 21–27, 1977	4,333	1,517				
Feb. 28–Mar. 6, 1977	3,290	1,299				
Mar. 7–13, 1977	2,308	969				
Mar. 14–20, 1977	2,190	778				
Mar. 21–27, 1977	2,525	882				
Mar. 28–Apr. 3, 1977	2,123	896				
Apr. 4–10, 1977	1,614	772				
Apr. 11–17, 1977	1,138	516				

[1] Figure does not meet NCHS's customary standards of reliability and precision (relative standard error exceeds 30 percent).

NOTE: Even though the suspension of the Public Health Service immunization program was lifted on Feb. 7, 1977, estimates of vaccinations are not shown after the week ending Dec. 19, 1976.