1968-1969

REPORT NO. 85
JUNE 30, 1969

NATIONAL COMMUNICABLE DISEASE CENTER

INFLUENZA - RESPIRATORY DISEASE SURVEILLANCE

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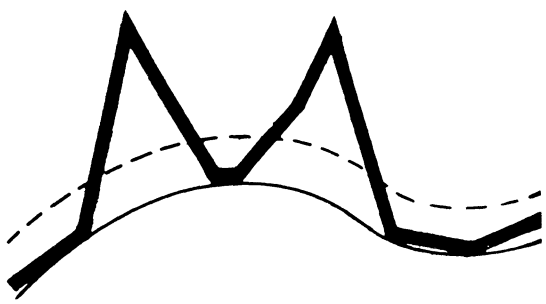
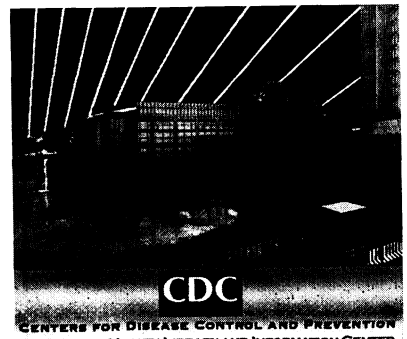


U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

PREFACE

Summarized in this report is information received from State Health Departments and other pertinent sources, domestic and foreign. Much of the information is preliminary. It is intended primarily for the use of those with responsibility for disease control activities. Anyone desiring to quote this report should contact the original investigator for confirmation and interpretation.

Contributions to the surveillance report are most welcome. Please address to: National Communicable Disease Center, Attn: Chief, Viral Diseases Branch, Epidemiology Program, Atlanta, Georgia 30333.



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I. UNITED STATES SURVEILLANCE SUMMARY 1968-69

During July 1968, an outbreak of A2 influenza occurred in Hong Kong, and subsequent laboratory studies on isolates demonstrated that the virus had undergone a major antigenic shift within the A2 classification. During August and September, 1968, the Hong Kong strains spread rapidly to Singapore, Taiwan, the Philippines, Japan, Australia, Iran, Thailand, and India. The first documented introduction of the Hong Kong strains into the United States was in early September. Additional introductions of the virus by international travelers occurred throughout the fall of the year (Figure 1) with an occasional small outbreak in a military population. Outbreaks in the civilian population were first documented in October, gained momentum in November (Figures 1, 2, and 3), were widespread throughout the country in December, peaked at about the first of the year (Figure 4), and fell off in January. In all, 44 states, the District of Columbia, and Puerto Rico reported widespread influenza A activity (Figure 5). Three states (Mississippi, Oklahoma, and Texas) reported regional activity; and three states (Wisconsin, Nebraska, and Hawaii) reported only isolated outbreaks. There was laboratory evidence of activity by the Hong Kong strains in all states except Nevada.

With the cooperation of the respective state epidemiologists, three surveys were conducted to determine the progression of the epidemic. The first survey, on December 20, showed that elevated school absenteeism was occurring in 38 states and elevated industrial absenteeism in 26 states (Table 1).

TABLE 1
Number of States (including District of Columbia and Puerto Rico)
With Absenteeism and Closed Schools Due to A2/Hong Kong/68 Influenza
As Ascertained by Surveys and Reports, 1968-69

DATE OF SURVEYS	STATES WITH ELEVATED SCHOOL ABSENTEEISM	STATES WITH ELEVATED INDUSTRIAL ABSENTEEISM	STATES WITH CLOSED SCHOOLS	STATES WITH CLOSED COLLEGES
December 20, 1968	38	26	17	23
January 11, 1969	21	13	2	2
January 25, 1969	17	8	0	0
Total Reports:				
Oct.'68-Mar.'69	52	32	23	24

One or more public or parochial schools in 17 states and one or more colleges and universities in 23 states dismissed their students early for Christmas vacation. By the time most schools reopened on January 6, peak influenza activity had occurred in 35 states. The second survey on January 11 showed a decline in influenza activity.

Pneumonia-influenza mortality (Figure 6) first exceeded the epidemic threshold during the week ending December 7, 1968, by which time 36 states, the District of Columbia, and Puerto Rico, had experienced one or more outbreaks. The number of excess deaths rose sharply and peaked during the week ending January 11, 1969. In each of the nine major geographic divisions of the United States a sharp wave of excess deaths was observed. Pneumonia-influenza mortality was paralleled by increases in the total number of deaths in the 122 monitored United States cities (Figure 7).

During the month of January, influenza activity due to the Hong Kong strains declined with only sporadic outbreaks occurring in rural areas and in populations not involved in the early part of the wave. However, in the last week of January, four states reported outbreaks of influenza B, which augmented the report of an isolated outbreak of influenza B occurring in the State of Washington in December. Then in February, many additional reports of influenza B activity were received. In all, 37 states had one or more cases of influenza B and 20 states had one or more outbreaks (Figure 5). Widespread activity was reported in a band throughout the central United States ranging from Minnesota and Wisconsin down to the northern half of Texas. Notably, almost no influenza B occurred in New England or New York.

Influenza B predominantly involved school-age children, especially those in elementary school. Several states reported school closings. In a few areas absenteeism was as high or higher than that observed during the wave of A2 Hong Kong activity. Although some excess mortality was still occurring in the United States at the time of the type B outbreaks, the three regions with the greatest excess mortality at this time (New England, Middle Atlantic, and Pacific) reported the least influenza B. Thus the excess was probably due to residual influenza A.

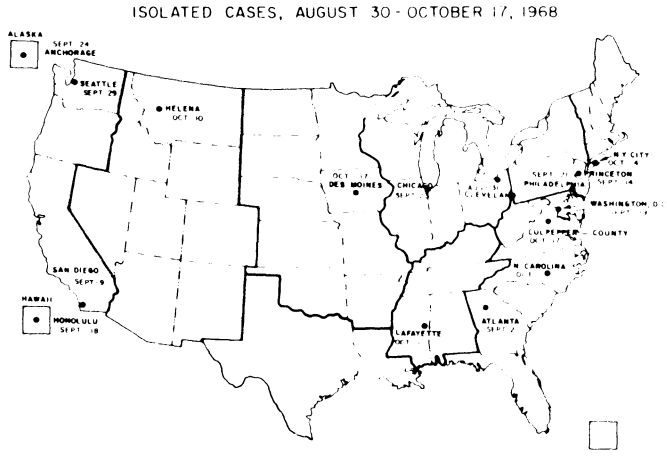
SYNOPSIS

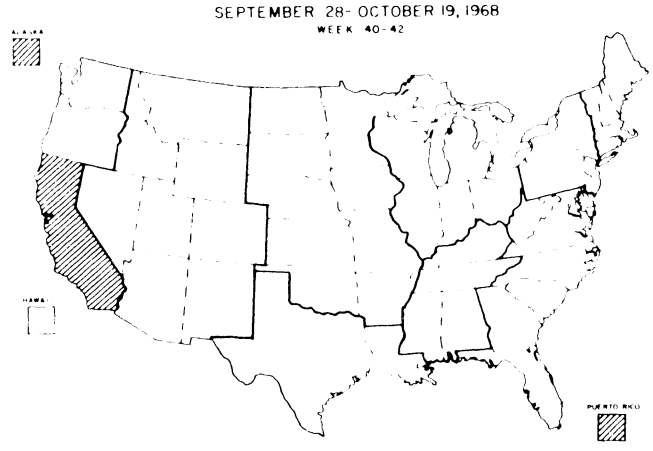
Following the occurrence of a major shift in the influenza A virus a widespread epidemic occurred in the United States. This was associated with a single large and sharp wave of excess mortality.

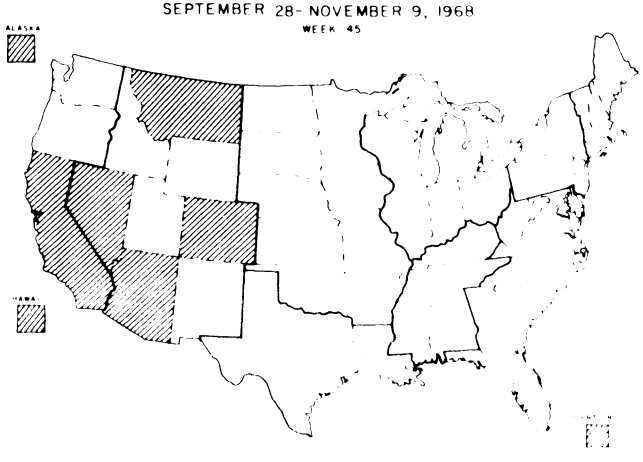
Following the peak occurrence of influenza A in December, influenza B began to be observed in some areas. Peak activity of influenza B was in February. In contrast, with the preceding influenza A epidemic, influenza B was confined largely to young school-age children, and there was no evidence of excess mortality.

Figure 1

OUTBREAKS OF INFLUENZA – LIKE ILLNESS IN THE UNITED STATES, 1968 - 1969







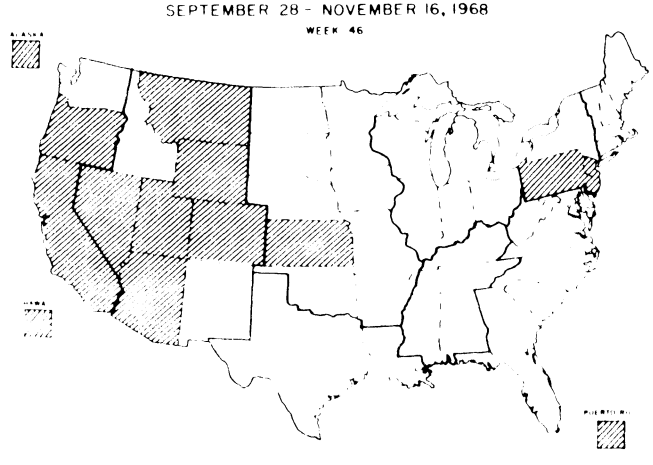
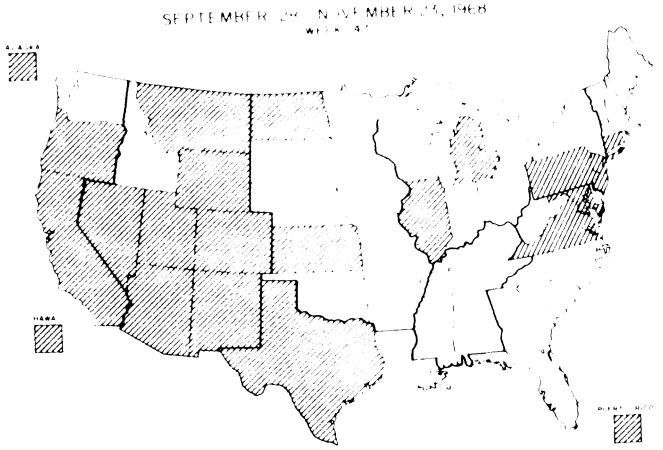
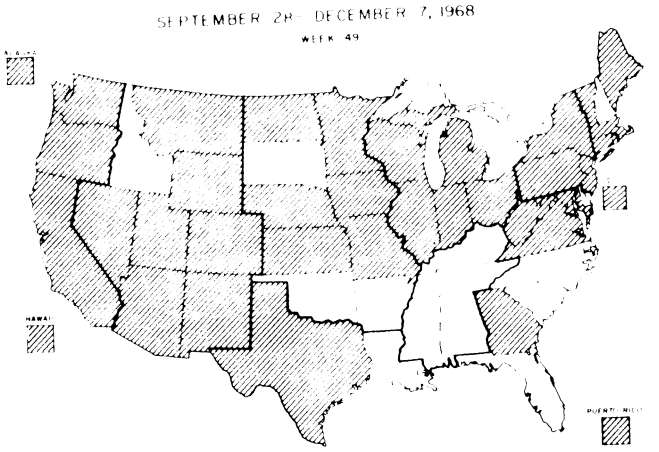
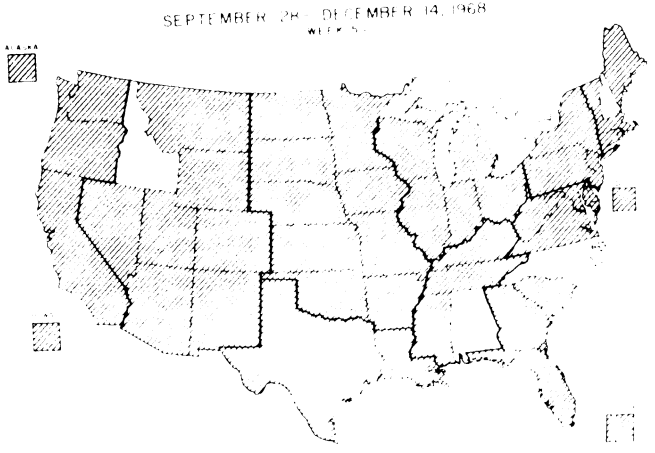


Figure 2

OUTBREAK OF INFLUENZA – LIKE ILLNESS IN THE UNITED STATES, 1968 – 1969







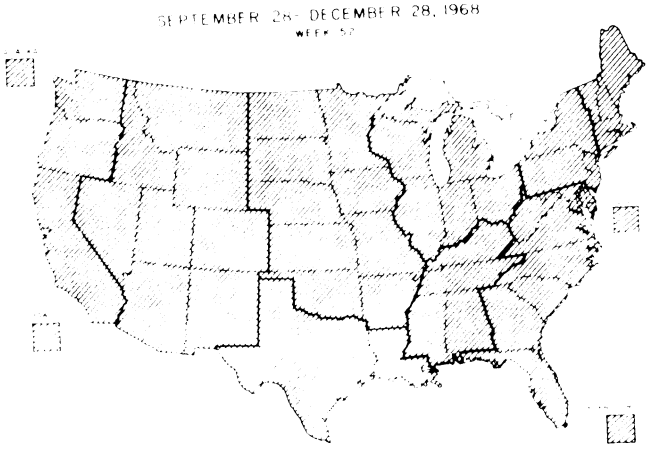


Figure 3 INFLUENZA OUTBREAKS, STATE AND WEEK OF FIRST OUTBREAK USA, 1968 – 1969

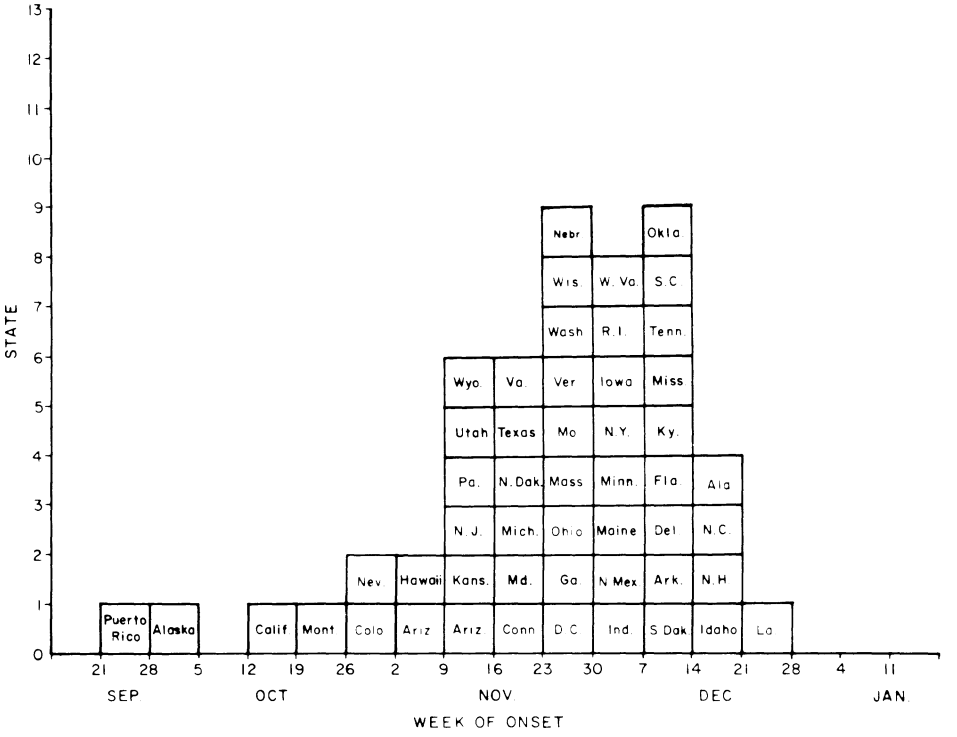


Figure 4 PEAK INFLUENZA ACTIVITY BY STATE AND WEEK USA, 1968 - 1969

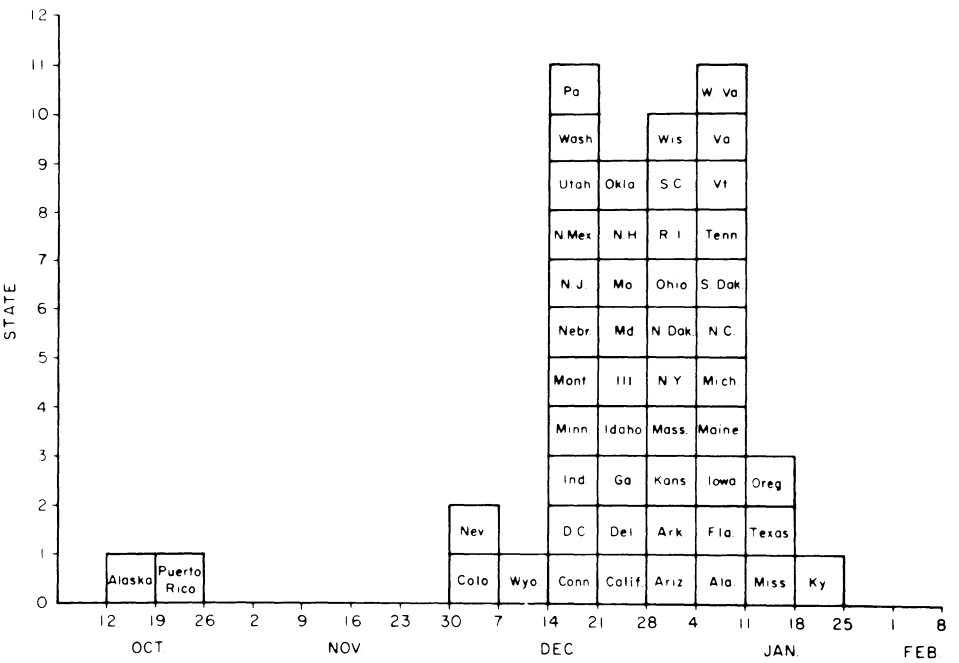
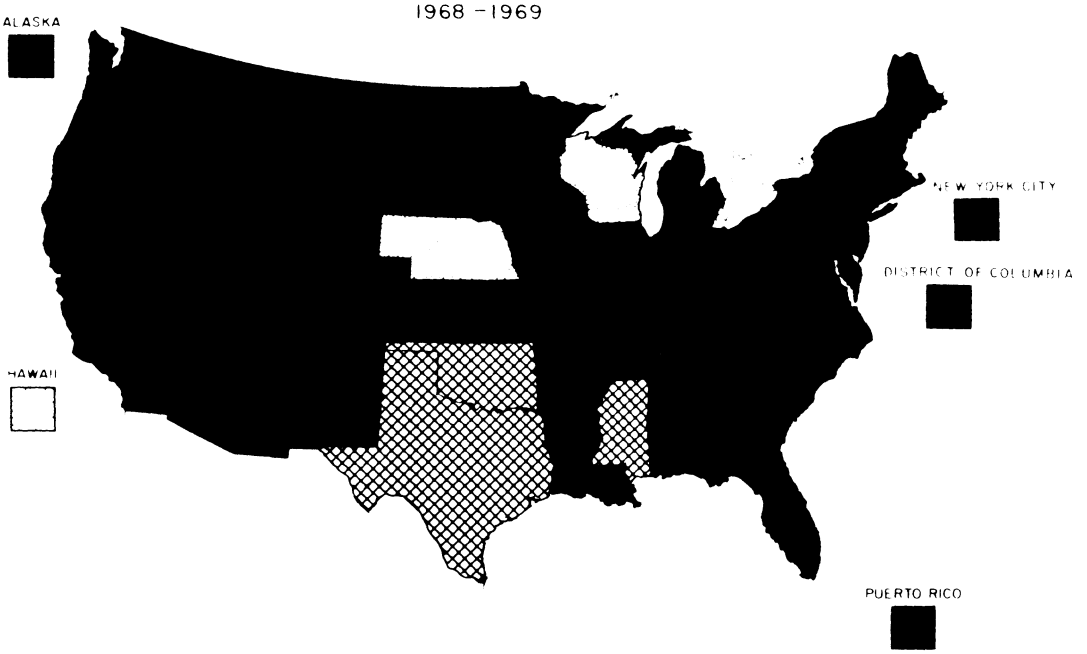


Figure 5

DISTRIBUTION OF INFLUENZA A
UNITED STATES
1968 – 1969



DISTRIBUTION OF INFLUENZA B
UNITED STATES
1968—1969

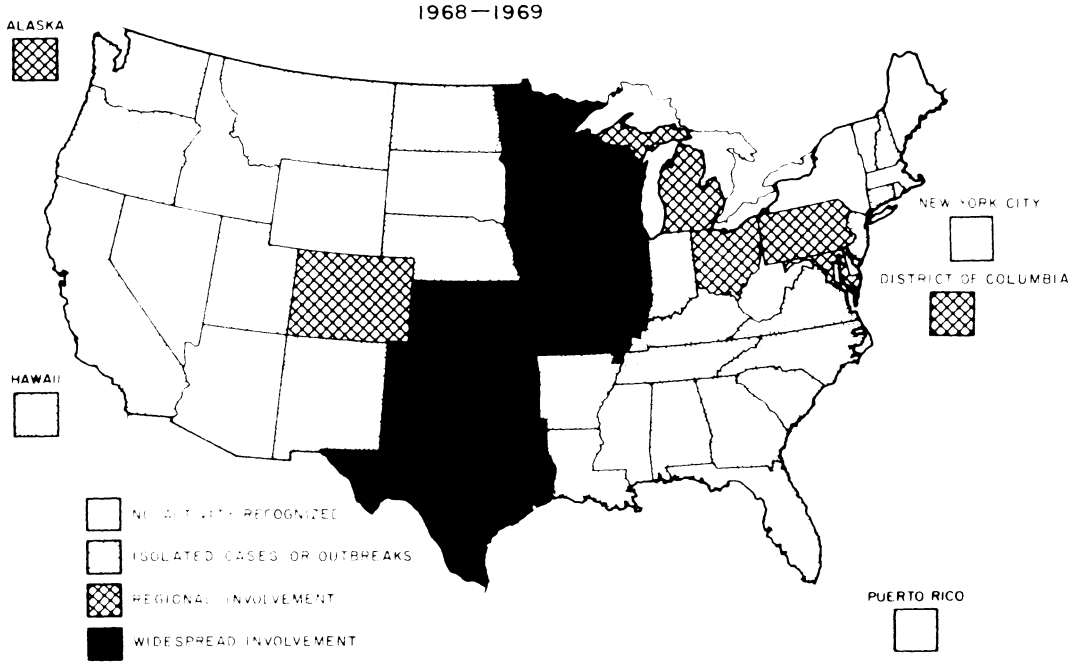


Figure 6 PNEUMONIA-INFLUENZA DEATHS IN 122 UNITED STATES CITIES

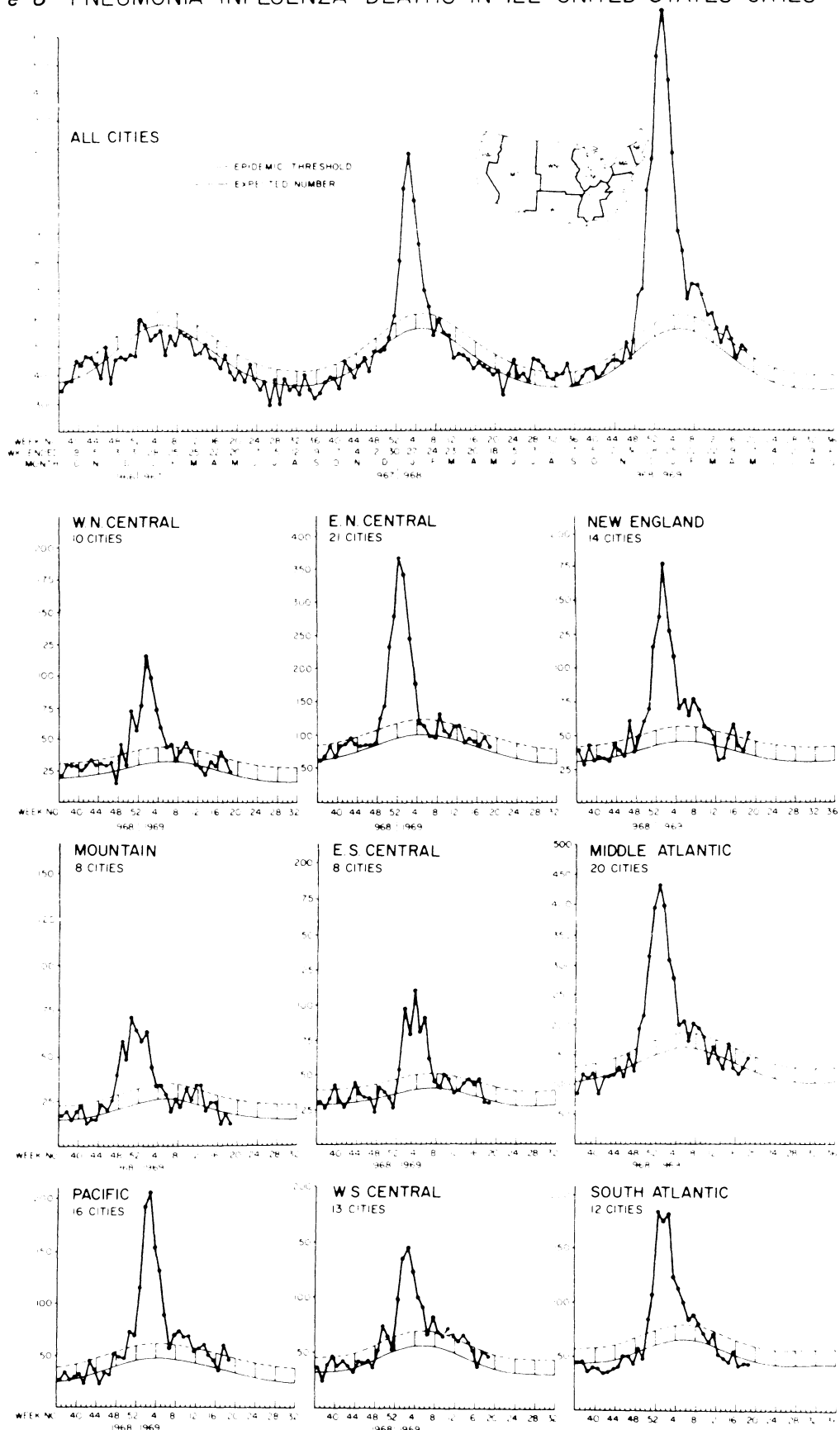
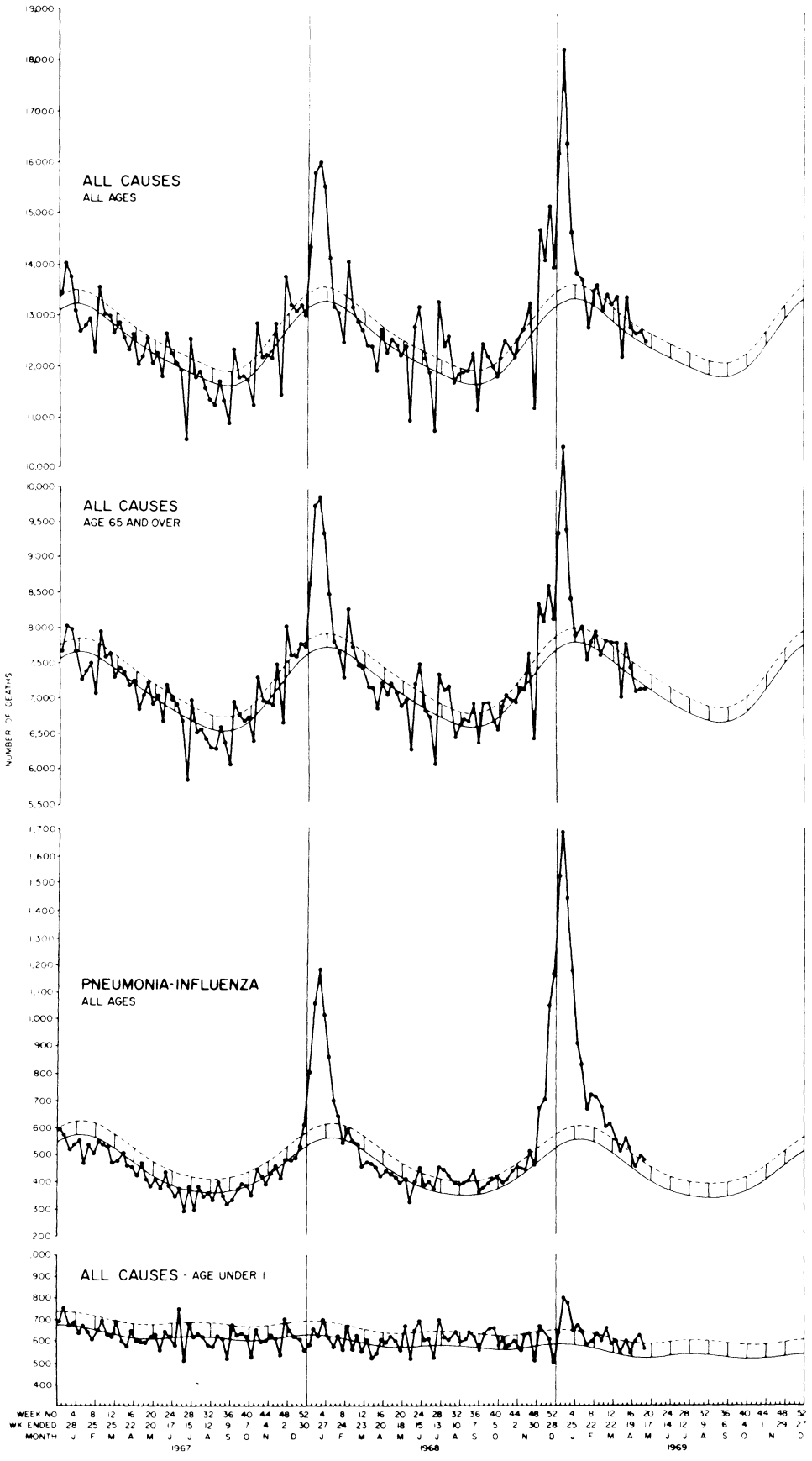


Figure 7 MORTALITY IN 122 UNITED STATES CITIES



II. MECHANICS OF INFLUENZA SURVEILLANCE AT STATE AND LOCAL LEVELS

The Influenza-Respiratory Disease Surveillance Report No. 84 (September 15, 1968) contained a review of the mechanics of influenza surveillance on a national level. At that time, it was pointed out that the national data was almost completely dependent upon locally organized surveillance systems. Below are two descriptions of surveillance systems at the state and city-county levels. These examples do not necessarily include all possible mechanisms of surveillance of influenza, but they do illustrate the type of system which can be efficiently organized and can provide up-to-date information on influenza activity.

A. INFLUENZA SURVEILLANCE IN PENNSYLVANIA

Organization of the Surveillance System

In order to delineate the extent of an anticipated outbreak of influenza, facilitate early laboratory confirmation of suspected cases, and elucidate the clinical and epidemiological characteristics of influenza infection, the Division of Communicable Diseases, Pennsylvania Department of Health, instituted a state-wide surveillance system to monitor daily absenteeism in representative schools and industries, and make such information readily available to appropriate laboratories and clinical institutions. Following consultation with field and laboratory personnel, the Division of Communicable Diseases established thirteen surveillance sites in the state. In most cases, these sites were located at state health centers and were supervised by public health nurses. Under the direction of the regional medical directors, personnel at each surveillance site obtained the cooperation of several local institutions which agreed to furnish daily attendance figures. At all surveillance sites an effort was made to include at least one elementary school, one high school, and one industry in the daily monitoring of absenteeism. Data from elementary schools or high schools in the same school district or in a very close geographic proximity were pooled for reporting as a single unit.

The geographic distribution of the surveillance sites was designed to represent the state's population. The exceptions were the metropolitan areas of Pittsburgh and Philadelphia which had separate, municipally administered surveillance systems. Excluding these two cities, the total population under surveillance was 8,079,500. Of this total, a sample of 106,152, or about 1.3 percent, was included in the daily absence monitoring (Table 1).

TABLE 1
Number of Participating Institutions and their Population

REGION	ELEMENTARY SCHOOLS No.	ELEMENTARY SCHOOLS Pop.	HIGH SCHOOLS No.	HIGH SCHOOLS Pop.	INDUSTRIES No.	INDUSTRIES Pop.
I	8	6,872	2	5,742	4	14,940
II	5	2,256	6	10,058	4	17,042
III	17	7,574	7	9,908	2	4,655
IV	2	1,729	2	4,120	3	1,307
V	2	3,878	2	2,897	2	3,265
VI	3	1,619	3	6,106	4	2,184
TOTAL	37	23,928	22	38,831	19	43,393

Absence monitoring began on December 2, 1968, and ended on January 31, 1969. During this period, personnel at each surveillance site contacted the cooperating institutions daily by telephone and obtained the absence figures for the same day. This was usually done in the latter part of the morning or early in the afternoon. Each afternoon the central office of the Communicable Disease Division in Harrisburg contacted each surveillance site by telephone, and obtained the data collected earlier in the day.

The office of the Communicable Disease Division analyzed the incoming data daily. Institutions which had experienced a noticeable increase in absenteeism were usually called the following morning to establish whether the absenteeism could be attributed to influenza. If this seemed to be the case, the state laboratory was informed and arrangements were made to obtain specimens for laboratory studies. Efforts were also made to obtain clinical histories, as well as pathological and laboratory confirmations, on all fatalities ascribed to influenza.

Finally, the Division of Communicable Diseases issued periodic reports on the status of influenza activity in the state. The reports included daily absence figures for each reporting institution, identification of areas of the state with increased absenteeism, and the location of laboratory confirmed cases in the state. This information was also correlated with the weekly influenza and pneumonia mortality figures for six metropolitan areas in the state. The reports were distributed to state and federal health units, medical schools, and hospitals, and were made available to lay organizations and institutions on request.

Effectiveness of Absenteeism Surveillance

Absence reports were received on 41 days from December 2, 1968, through January 31, 1969. The twenty days for which no reports were received consisted of 16 weekend days, two legal holidays, and two half-days for most state offices. In addition, because of the holiday recess, no absence figures were collected from elementary and high schools from December 23 to January 1.

Although 19 industries participated in absence monitoring, reports from all of them could not always be obtained every day. Some industries had difficulty in compiling and reporting the day's absenteeism on the same day. Moreover, during the holiday season, there were brief lapses in reporting. The average number of industries reporting per day was 13.2 or 70 percent of the total number monitored. By comparison, the average number of schools reporting per day was 56 out of 59, or 95 percent.

The highest peak of industrial absenteeism was recorded on January 6, 1969, (Figure 8) when 11 (73%) of the 15 industries submitting reports on that day had greater than twice normal absenteeism. A smaller peak of 60 percent had occurred on December 17 and 18 and had coincided with the opening of the hunting season.

The highest school absenteeism for the state as a whole occurred during the third week of December and the first week of January (Figure 9). Because of the school recess, no figures are available for the intervening period. A smaller absence peak was noted on January 29 and coincided with a severe ice storm which was experienced in several areas of the state.

From simple observation of the reported data it was evident that increased absenteeism began in the southeast corner of the state and progressed sequentially over a 5-week period first to the northern and then to the western portion of the state. Over 600 isolations of Hong Kong strains were made during the epidemic by the state laboratories. Specimen collection was facilitated by early identification of areas of the state with probable influenza activity.

Figure 8 INDUSTRIAL ABSENTEEISM, PENNSYLVANIA, DECEMBER 1968 — JANUARY 1969

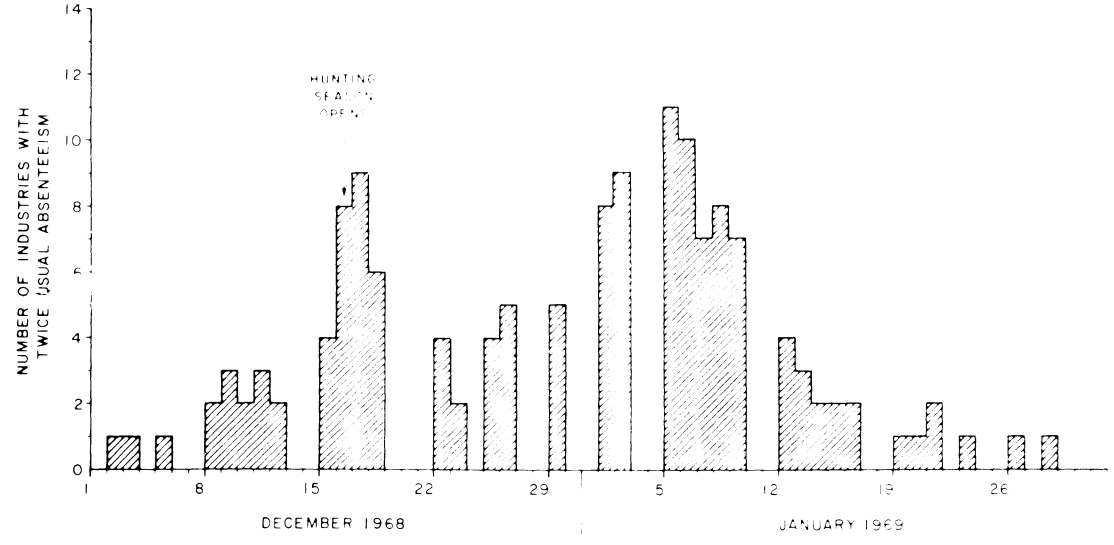
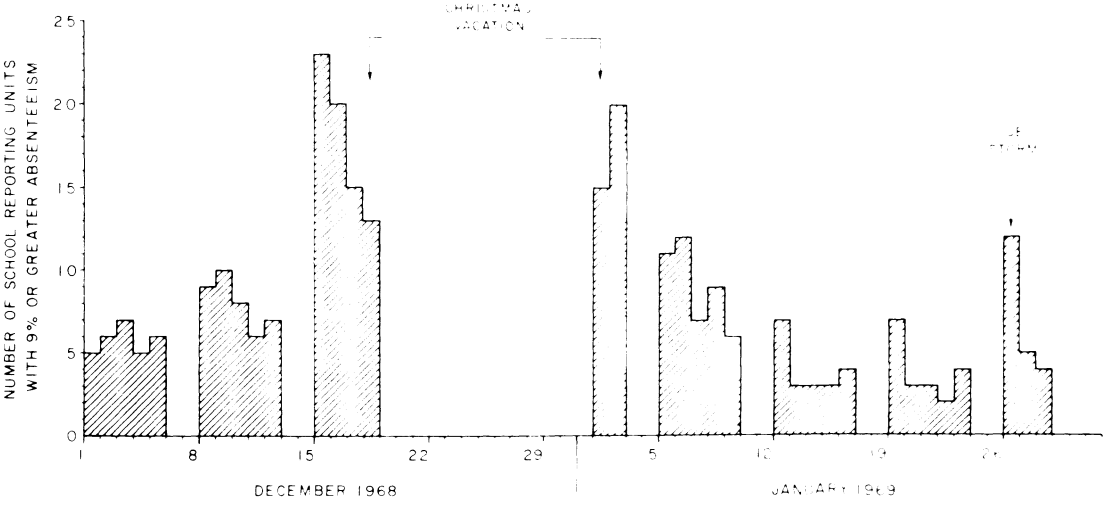


Figure 9 SCHOOL ABSENTEEISM, PENNSYLVANIA, DECEMBER 1968 — JANUARY 1969



Of interest in itself and also confirming the surveillance data is the fact that counties in the eastern part of the state tended to have higher numbers of pneumonia-influenza deaths in December than in January. This was in contrast to counties in the western part of the state and in contrast to the usual pattern of peak pneumonia-influenza deaths occurring in January or February. There were 26 laboratory isolations of the influenza virus from post-mortem specimens of lung tissue.

(Reported by: William D. Schrack, Jr., M.D., Director, David A. Hall, Robert E. Longenecker, and Isaak F. Gratch, M.D., Division of Communicable Diseases, Pennsylvania Department of Health; and Victor R. Hrehorovich, M.D., EIS Officer.)

B. INFLUENZA SURVEILLANCE IN LOS ANGELES

The most recent epidemic of A2 influenza in Los Angeles, prior to the appearance of the Hong Kong strains, was in early 1966, with an estimated peak occurrence on or about February 20, 1966. Although much of the nation experienced epidemic A2 influenza in the 1967-68 season, this was not true of California, including Los Angeles. In the fall of 1968 an influenza surveillance system was established throughout Los Angeles County to monitor any possible epidemic activity in the 1968-69 season. This surveillance system consisted of the following items:

1. Excess absenteeism reporting; beginning in September 1968, each of the 576 public schools in the City of Los Angeles reported daily by telephone if and when 10 percent or greater absenteeism occurred. The city school system includes 130 senior and junior high schools, and 446 elementary schools.

2. Reporting of weekly attendance data in schools; a sample of 30 schools, including parochial schools and schools in Los Angeles County not necessarily within the city limits, reported weekly absenteeism by mail. The weekly total figure was derived by the following formula:

$$\text{Total \% absent} = \frac{\text{Total absent for 30 schools}}{\text{Total enrollment x number of school days in the week}} \times 100$$

3. Reporting of industrial absenteeism; a large local telephone company, employing approximately 10,000 persons, reported weekly totals of employees who attributed their absence from work to influenza.

4. Collection of data on pediatric emergency room admissions; the Los Angeles County--USC Medical Center Pediatric Emergency Room reported daily on the total number of patients seen, and the number of patients seen with upper respiratory illness, influenza, or nonspecific, presumably viral, febrile illness.

5. Tabulation of pneumonia-influenza deaths; the Records and Statistics Division of the County of Los Angeles Health Department has projected an "expected" curve from past experience with pneumonia-influenza deaths. Against this were plotted the actual deaths reported to the Health Department on a weekly basis.

Results:

Between November 15-20, 1968, the first indications of possible influenza activity in Los Angeles County were reported to the health department. These included elevated absenteeism at one junior high school, an in-hospital outbreak of clinical influenza, increased numbers of flu-like illness at an industrial health facility, and increased numbers of respiratory illness seen at a college clinic. These four sources were widely separated geographically within Los Angeles County. From each, at least one specimen grew an influenza virus similar to the Hong Kong strains. The first indication of countywide activity appeared during the 49th week ending December 7, 1968, when the total number of illnesses suggestive of influenza seen in the Pediatric Emergency Room rose sharply (Figure 10). On December 9 there was a sharp rise in the number of schools reporting 10 percent or greater absenteeism (Figure 11). A similar rise was seen in the number of employees reporting influenza-like illness at the telephone company (Figure 12). A somewhat smaller increase in total absenteeism was also observed for the 30-school sample for the weeks ending November 30 and December 7 (Figure 13).

The schools reporting excess daily absenteeism reached a peak on December 16, followed by a rapid decline. Total absenteeism from the 30-school sample rose steadily until the onset of Christmas vacation on December 20. After the reopening of schools on January 6, the number of schools reporting excess absenteeism was at pre-epidemic levels, and total absenteeism for the 30-school sample approached normal levels. By comparison, the illnesses at the telephone company showed a peak in the week ending December 28, but did not return to normal until January 25. Pneumonia-influenza deaths rose sharply on the week ending January 3 (Figure 14), and peaked two weeks later on the week ending January 18.

Comment:

The surveillance data reveal that the course of the influenza epidemic in Los Angeles was both rapid and dramatic. During any epidemic health departments are traditionally besieged by questions pertaining to the onset, peak, duration, and intensity of the outbreak. The surveillance techniques employed here provided approximate, but practical, answers to these questions. With consistency in the application of these methods, it should be possible to compare a current epidemic with previous ones.

(Reported by: Ichiro Kamei, M.D., Chief, and Robert Murray, Acute Communicable Disease Control Division, Los Angeles County Health Department; and Harvey J. Matlof, M.D., EIS Officer.)

Figure 10 UPPER RESPIRATORY ILLNESSES PLUS UNCLASSIFIED VIRAL ILLNESSES PEDIATRIC EMERGENCY ROOM

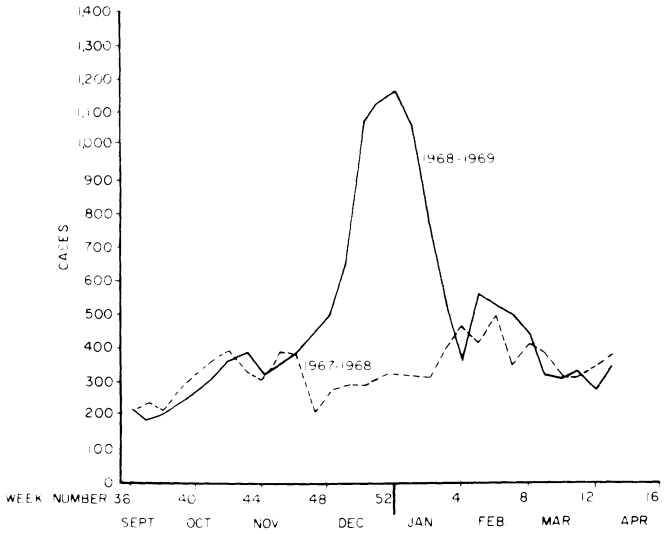


Figure 11 DAILY EXCESS SCHOOL ABSENTEEISM, CITY OF LOS ANGELES NOVEMBER 17, 1968 - JANUARY 21, 1969

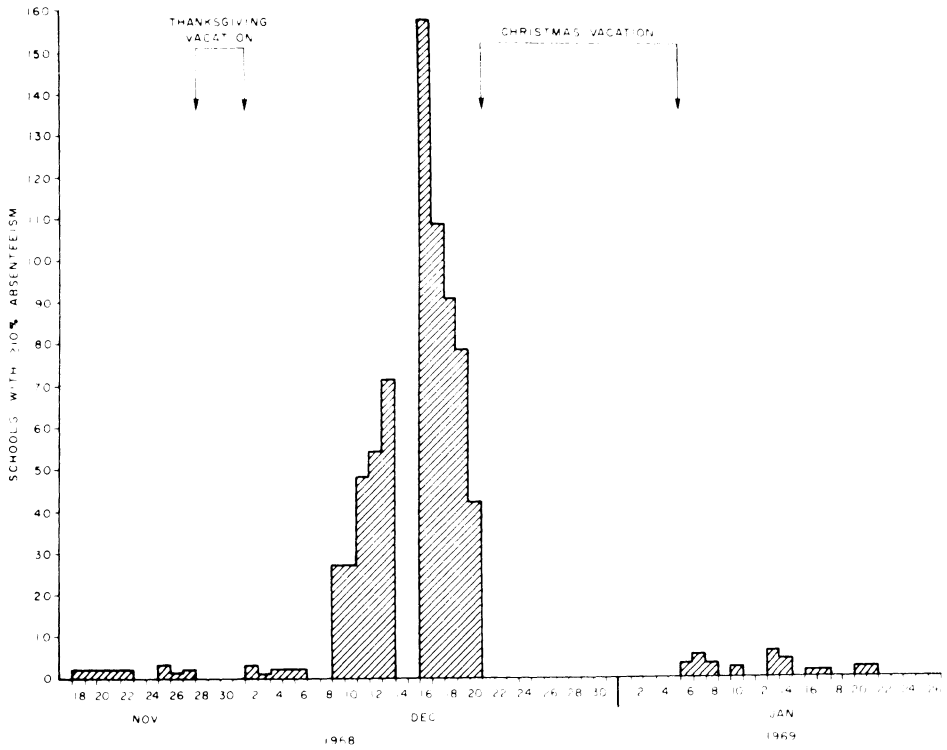


Figure 12 TELEPHONE COMPANY EMPLOYEES* ATTRIBUTING ABSENCES TO INFLUENZA

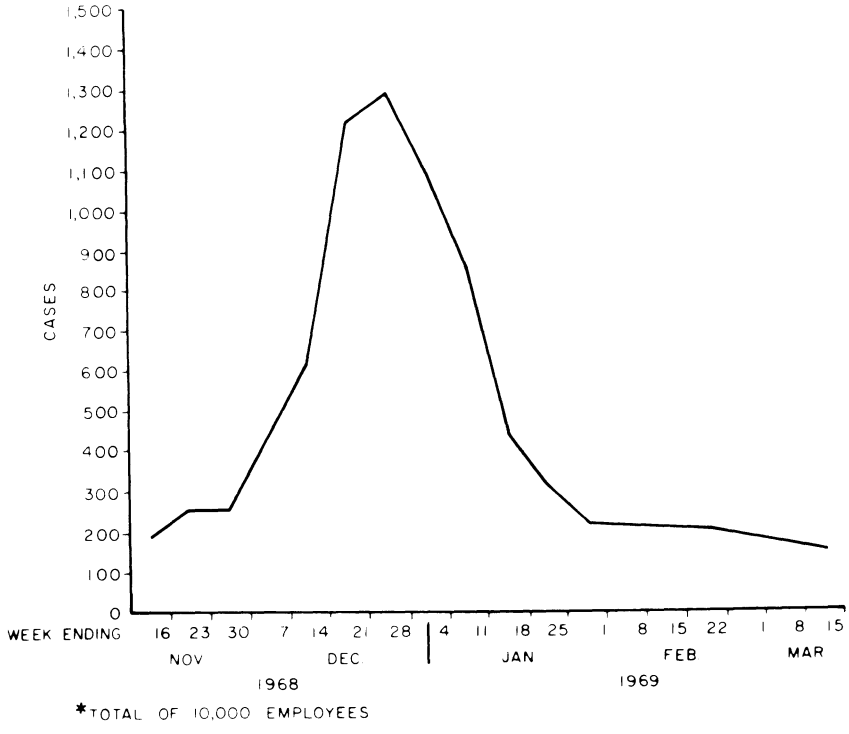


Figure 13 ABSENTEEISM IN 30 LOS ANGELES COUNTY SCHOOLS, OCTOBER 11, 1968 - MARCH 28, 1969

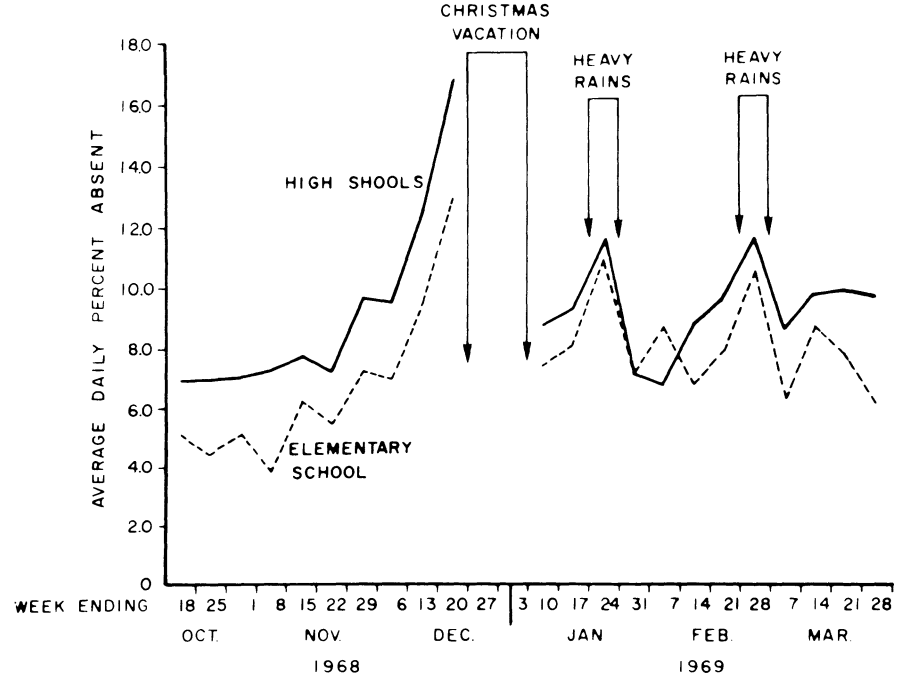
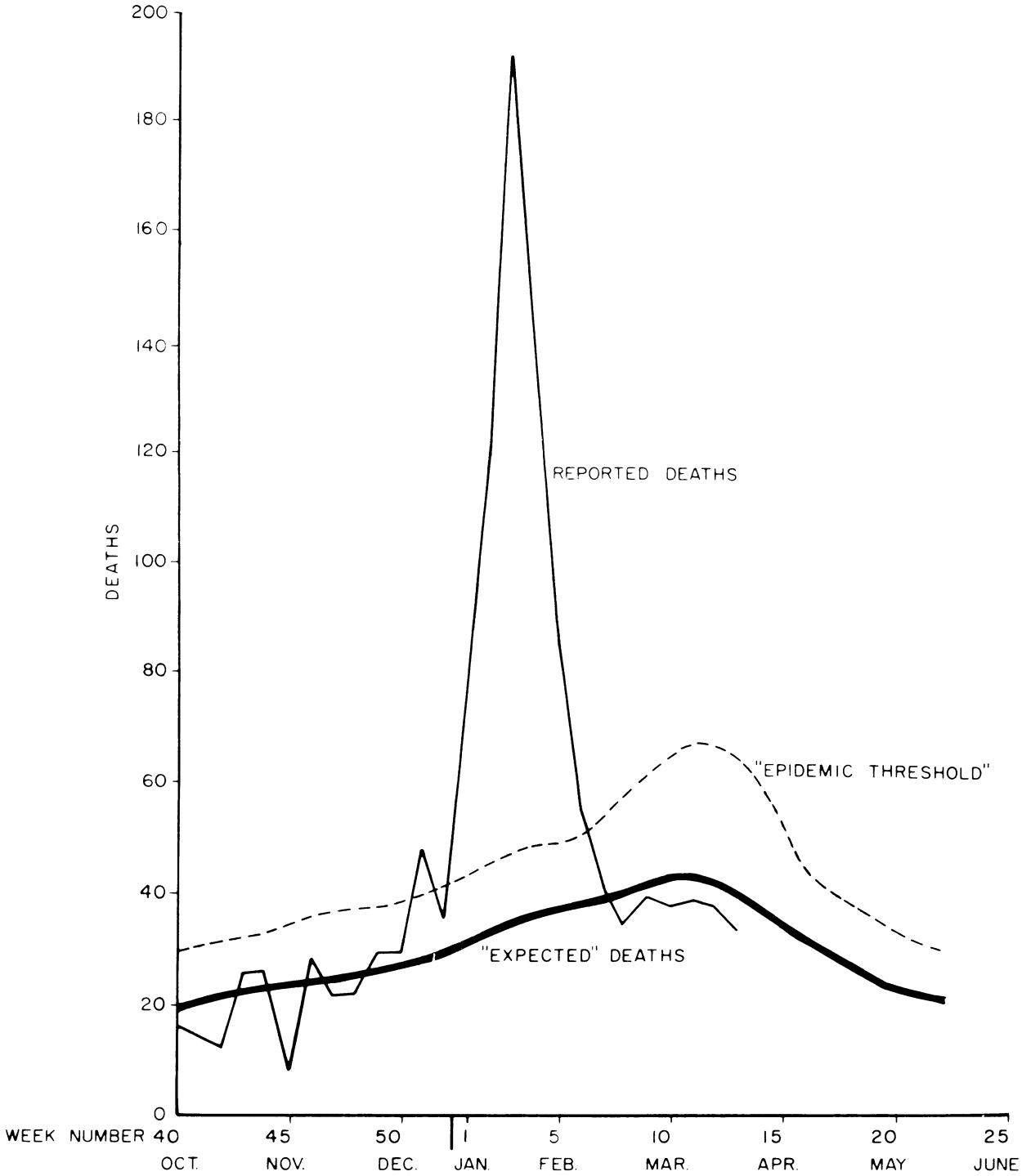


Figure 14 WEEKLY PNEUMONIA AND INFLUENZA DEATHS
LOS ANGELES COUNTY, 1968-1969



III. INTERNATIONAL NOTE

It has been customary to include a summary of influenza activity outside the United States in the influenza surveillance report. For several reasons, departure from this tradition seems appropriate at this time. Information on influenza activity in southeast Asia as it occurred following the initial outbreak in Hong Kong in July 1968, was covered in the Influenza-Respiratory Disease Surveillance Report No. 84 and in issues of the Morbidity and Mortality Weekly Report throughout the fall of 1968. Soon there was evidence of spread of the Hong Kong virus strains to most other parts of the world. As the 1968-69 winter season began, and as influenza outbreaks were reported from many countries in the World Health Organization Weekly Epidemiological Record, these notes were reprinted in the Morbidity and Mortality Weekly Report.

It is known that the Hong Kong strains did not have the same impact in all countries. In England, for example, although there was extensive laboratory evidence that the Hong Kong strains were present, there was no indication of excess mortality[1]. Detailed information on the epidemiology of the Hong Kong strains in various countries is not presently available to the Respiratory Viral Disease Unit. In October 1969, however, the opening session of an international working conference on Hong Kong influenza sponsored jointly by Emory University, the National Communicable Disease Center, and the World Health Organization, is scheduled for discussion of the epidemiology of influenza throughout the world, with detailed reports from selected countries. These proceedings are then scheduled to be published in a special issue of the Bulletin of the World Health Organization, and should be available for reference in early 1970.

[1]British Medical Journal, News and Notes - Epidemiology, Volumes 1 and 2, 1969.

IV. LABORATORY REPORT

A. INFLUENZA A

Initial characterization of the Hong Kong/68 influenza variants has previously been reported[1]. During the extensive epidemics of Hong Kong influenza which occurred in the following months, over 300 influenza A isolates were submitted to the International Influenza Center for the Americas. Of these, 243 strains, representing 45 laboratories in the United States, and 46 strains, representing 14 other countries, were selected for antigenic characterization. All were shown by hemagglutination inhibition to be similar to each other and to the original Hong Kong strains. All strains continue to show reciprocal crossing by HI with previous A2 strains but not with pre-1957 type A viruses. The neuraminidase antigen of the Hong Kong variants resembles that of 1964 and 1967 strains of A2 virus[2].

The Hong Kong variants were readily isolated from throat swabs or washings and especially from nasal washings by inoculation of eggs or tissue cultures. There was hemagglutination generally on the first passage and the titers were unusually high.

[1]National Communicable Disease Center; Influenza-Respiratory Disease Surveillance Report, No. 84, September 15, 1968.

[2]Coleman, M. T., W. R. Dowdle, H. G. Pereira, G. C. Schild, W. K. Chang, The Hong Kong/68 Influenza A2 Variant. Lancet, ii, pages 1384-1386, 1968.

At the International Influenza Center for the Americas the overall recovery rate was 46 percent from clinical specimens collected and shipped under a wide variety of conditions. Furthermore, influenza viruses were isolated from 90 percent of the specimens collected from local outbreaks. When parallel inoculations were performed, only about half the number of isolates recovered in eggs were also isolated in primary rhesus kidney tissue culture.

B. INFLUENZA B

Fifty-four influenza B strains have been examined. These represent Canada, Japan, Trinidad, Alaska, Hawaii, and 8 of the continental United States. In contrast to the A2/Hong Kong variants, influenza B viruses were isolated much more readily in primary rhesus kidney cultures than in embryonated eggs, although they can be adapted for propagation in eggs.

Table 1 gives reciprocal HI titers for nine 1968-69 influenza B strains and nine earlier reference strains. To simplify interpretation of the interrelationships among these strains, similarity coefficients were calculated by the formula of Archetti and Horsfall (Table 2). A coefficient value of 1 indicates two viruses were indistinguishable by HI reactions with homologous and heterologous antisera. Larger coefficient values indicate increasing dissimilarity.

Based on the same HI data, the numerical taxonomic methods described by A. M. Lee[3] were used to calculate correlation coefficients which were analyzed for clusters of related strains. Figure 15 is a dendrogram, or family tree, constructed for 18 influenza B strains. The reactions of a virus strain with each of the 18 antisera were considered as multivariate observations on that strain. By the method of average of correlations, a strain is admitted to a cluster on the basis of an average linkage with existing members of the cluster.

All of the influenza B isolates since B/Massachusetts/3/66 form a tight cluster of closely correlated (0.90) strains except for the University of Chicago strain which correlates with the group as a whole at 0.67. At the level of correlation of 0.65 there are 3 clusters of B virus strains and 2 individual strains (B/Lee and B/GL) which are representative of recognized earlier clusters. The 1968-69 influenza B viruses are a relatively homogenous group of strains closely related to the B/Massachusetts/3/66 vaccine strain.

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[3]Lee, A. M., Numerical Taxonomy and the Influenza B Virus. Nature. 217:621-623. 1968.

Table 1

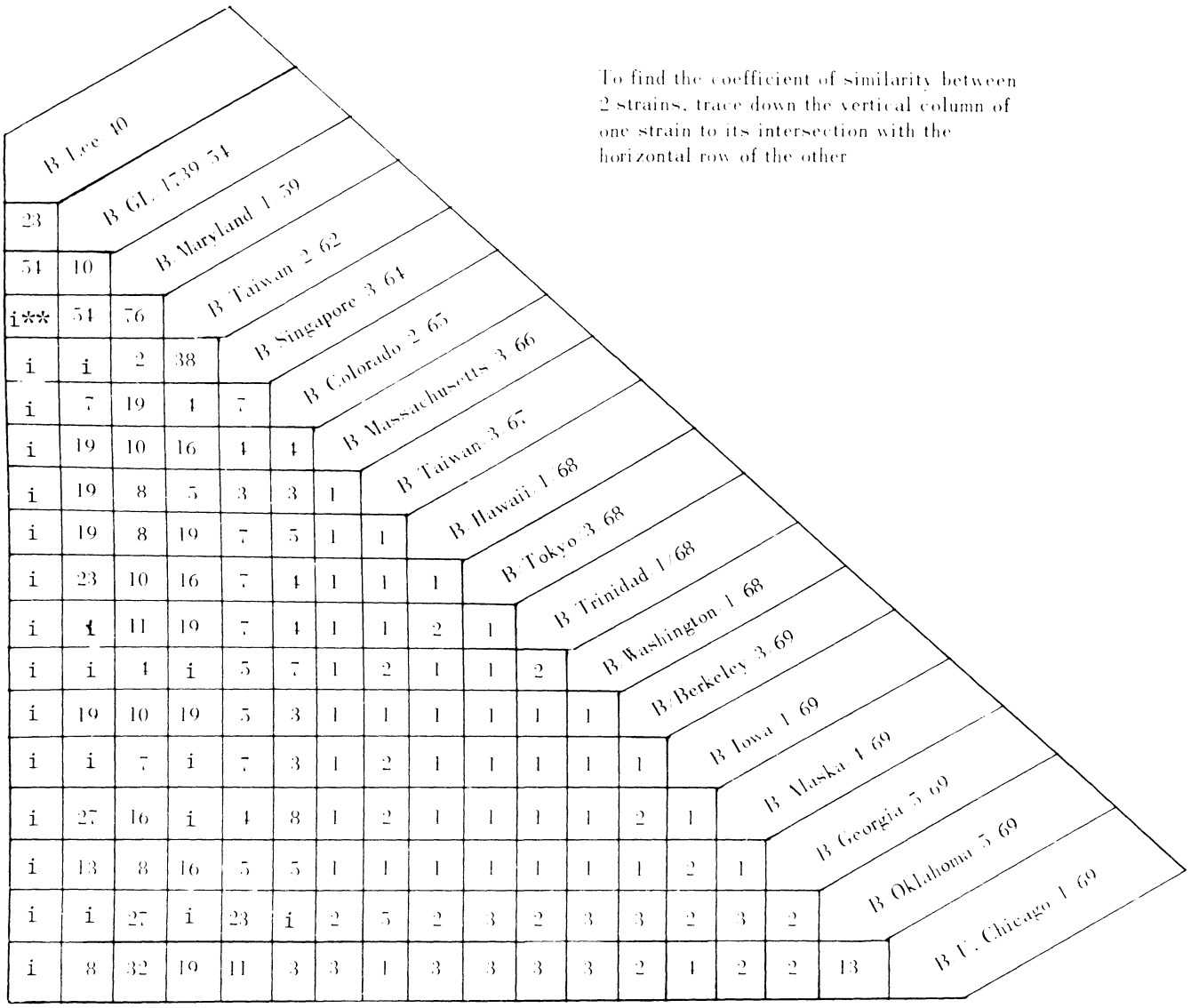
Hemagglutination Inhibition*: Type B Influenza Viruses, 1940-1969

Antisera** \ Antigens	B Lee 40	B GL 1739 54	B Maryland 1 59	B Taiwan 2 62	B Singapore 3 64	B Colorado 2 65	B Massachusetts 3 66	B Taiwan 3 67	B Hawaii 1 68	B Tokyo 3 68	B Trinidad 1 68	B Washington 1 68	B Berkeley 3 69	B Iowa 1 69	B Alaska 1 69	B Georgia 5 69	B Oklahoma 5 69	B U. Chicago 1 69
B Lee 40	226	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B GL 1739 54	20	453	160	10	28	28	14	20	14	28	14	20	20	14	20	20	10	28
B Maryland 1 59	14	57	1810	10	640	14	80	57	40	160	40	80	80	113	57	57	160	14
B Taiwan 2 62	14	14	28	905	57	57	40	28	14	28	10	20	28	28	28	20	20	20
B Singapore 3 64	0	0	320	7	640	14	57	57	20	80	20	40	80	40	57	28	80	20
B Colorado 2 65	0	28	28	80	80	80	57	40	20	80	20	40	57	57	40	28	57	28
B Massachusetts 3 66	0	14	40	14	113	14	160	160	80	320	57	160	226	226	226	113	640	28
B Taiwan 3 67	14	7	57	160	113	28	113	113	80	160	57	80	113	113	113	57	80	57
B Hawaii 1 68	0	40	320	80	320	80	453	1280	453	2560	226	905	1810	640	1280	320	3620	113
B Tokyo 3 68	0	14	57	57	80	28	160	160	160	453	80	226	320	226	320	80	320	57
B Trinidad 1 68	0	0	14	10	28	10	57	57	28	320	40	57	113	113	113	57	160	14
B Washington 1 68	0	0	226	0	113	7	113	57	57	226	40	160	113	113	113	57	160	20
B Berkeley 3 69	0	10	40	14	57	28	160	160	113	320	57	160	160	113	226	57	226	57
B Iowa 1 69	0	0	28	0	28	10	57	28	28	80	14	57	57	80	80	28	160	10
B Alaska 1 69	0	7	28	0	160	7	80	80	80	320	40	160	28	160	226	57	160	80
B Georgia 5 69	0	28	113	40	226	28	453	453	226	453	320	453	453	160	453	226	1280	113
B Oklahoma 5 69	0	0	14	0	14	0	57	57	28	160	40	80	80	113	113	28	905	7
B U. Chicago 1 69	0	28	14	14	28	28	80	113	57	113	40	80	80	57	113	57	80	113

*Geometric mean HI titers of duplicate tests.

**Chicken antisera treated with receptor destroying enzyme.

Table 2
Strain Relationships* of Type B Influenza Viruses



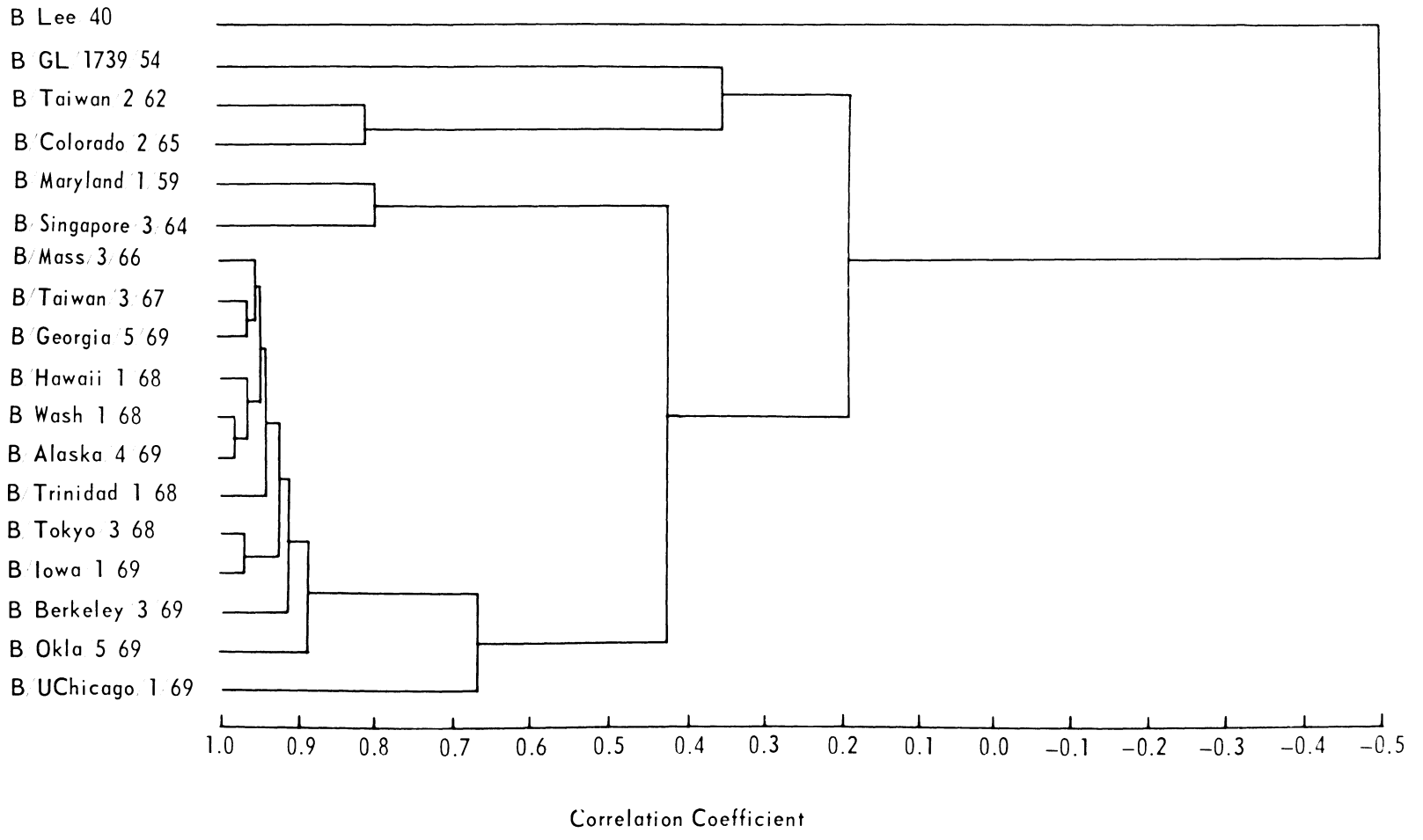
To find the coefficient of similarity between 2 strains, trace down the vertical column of one strain to its intersection with the horizontal row of the other

	B Lee 40	B GL 1739 54	B Maryland 1 59	B Taiwan 2 62	B Singapore 3 64	B Colorado 2 65	B Massachusetts 3 66	B Taiwan 3 67	B Hawaii 1 68	B Tokyo 3 68	B Trinidad 1 68	B Washington 1 68	B Berkeley 3 69	B Iowa 1 69	B Alaska 4 69	B Georgia 5 69	B Oklahoma 5 69	B U. Chicago 1 69
23																		
54	10																	
i**	54	76																
i	i	2	38															
i	7	19	4	7														
i	19	10	16	4	4													
i	19	8	5	3	3	1												
i	19	8	19	7	5	1	1											
i	23	10	16	7	4	1	1	1										
i	1	11	19	7	4	1	1	2	1									
i	i	4	i	5	7	1	2	1	1	2								
i	19	10	19	5	3	1	1	1	1	1	1							
i	i	7	i	7	3	1	2	1	1	1	1	1						
i	27	16	i	4	8	1	2	1	1	1	1	2	1					
i	13	8	16	5	5	1	1	1	1	1	1	1	2	1				
i	i	27	i	23	i	2	5	2	3	2	3	3	2	3	2			
i	8	32	19	11	3	3	1	3	3	3	3	2	1	2	2	13		

*Similarity coefficients (r) according to the formula of Archetti and Horsfall, J. E. M. 92:441, 1950.

**i = indeterminate.

Figure 15 INFLUENZA B VIRUS STRAINS CLUSTERED BY AVERAGE OF CORRELATIONS



V. SPECIAL REPORTS

A. INTERNATIONAL TRAVEL AND THE HONG KONG STRAINS

With the occurrence of a major epidemic of influenza in Hong Kong in July, 1968, health officials throughout the United States were alerted to the probability of importation of the virus into the country. Individual case investigations were made in several instances and have previously been noted (Figure 1, page 3). When, on Sunday morning September 29, 1968, a crew member of a flight which had just arrived in Seattle from Tokyo was reported to be acutely ill, the opportunity was seized not only for investigation of the single case, but also for determination of the geographic spread of the virus which might occur if one or more of the persons on such an international flight had influenza.

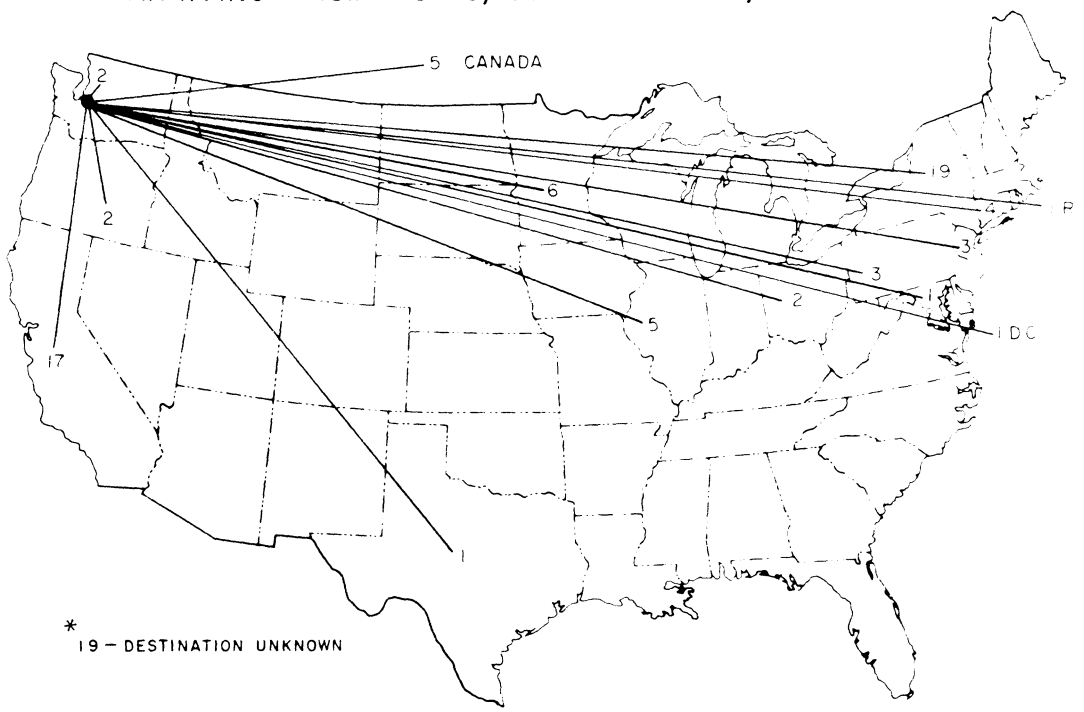
The patient had a typical influenza-like illness, for which he was hospitalized. An A2 virus isolate (Hong Kong variant) was obtained from a nasopharyngeal swab specimen, and diagnostic rises in HI and CF titer were demonstrated. The patient's itinerary from the time he left Seattle on the 24th of September until the time he returned on the 29th indicated stopovers in Tokyo, Hong Kong, and Seoul, Korea. The patient was the only one of the seven crew members who had an illness during these flights; and although the patient was in direct contact with all the other crew members during his illness on the return flight to Seattle, no other crew member became ill in the week following this contact. No other patient or staff member in the hospital where the crew member was a patient became ill either.

Although the passengers aboard the plane did not have direct contact with the crew member, a determination of the final destination of each passenger was made (Figure 16). Only two passengers remained in the Seattle area. Of the remaining 89 passengers, destination for 19 was unknown, 5 went to Canada, 26 remained west of the Mississippi River, and 39 traveled to the east. The same plane which had returned from Tokyo to Seattle then continued to John F. Kennedy Airport in New York City. On September 29, 29 of the passengers remained on the flight to New York.

It is of interest that 2½ weeks earlier, on September 12, 1968, an entering freshman at Princeton University who lives near Seattle got aboard a similar flight which had returned from the Far East and took it to New York City. On September 14, the boy became ill with a typical influenza-like syndrome. A specimen grew an influenza A2 virus (Hong Kong variant).

(Reported by: Donald R. Peterson, M.D., Director, Epidemiology and Communicable Disease Control, Seattle-King County Department of Public Health; Lawrence K. Altman, M.D., Resident, Internal Medicine, University of Washington, Seattle, Washington; Ronald Altman, M.D., Director, Division of Preventable Diseases, New Jersey State Department of Health, and Willard Dalrymple, Director, Student Health Service, Princeton University.)

Figure 16 ULTIMATE DESTINATION BY STATE OF 91 AIRLINE PASSENGERS* ARRIVING FROM TOKYO, SEPTEMBER 29, 1968



B. INFLUENZA EPIDEMIC IN MINING COMPANY EMPLOYEES, UTAH

On November 27, 1968, a representative from the State Health Department in Salt Lake City went to a mining town in Eastern Utah to investigate an ongoing influenza outbreak. Peak illness had occurred in mid-November at which time school absenteeism (20% junior high, 18% high school, 13% elementary school) and industrial absenteeism were both markedly increased. Although four throat washings were negative, analysis of unpaired acute and convalescent blood specimens revealed a six-fold increase in geometric mean HI titer against the Hong Kong strain in the convalescent group. This was significant by a Student's t-test ($P < 0.01$). There was no significant difference in the titers against influenza B.

One of the potash mining companies near the town had had company-sponsored influenza immunization programs in the fall of 1968 and in the fall of 1967; and it was known that there was extensive illness among employees in November. On December 6, 1968, an investigation to determine the clinical effectiveness of these commercially available influenza vaccine was undertaken.

Approximately 75 percent of the 378 employees work underground, serving 8-hour shifts in a continuous around-the-clock operation. Two hundred and five persons received a series of two doses of influenza vaccine in 1967, and 188 persons received a single dose of influenza vaccine on October 26, 1968. In both years, a standard commercial polyvalent influenza vaccine was used.

On December 6, a questionnaire was circulated to the approximately 100 employees who worked on the surface (mostly clerical and supervisory personnel.) On the same day, 88 questionnaires were returned. After preliminary examination of the questionnaires, 12 convalescents and 14 not-ill persons were asked to contribute blood samples. The investigators from the State Health Department returned to Salt Lake City that evening, having left questionnaires for distribution to the remaining less-accessible employees. By December 16, 1968, 194 questionnaires were received from the remaining employees.

The results of the serologic study (Table 1) were compatible with the occurrence of influenza caused by a Hong Kong strain. Furthermore, the low geometric mean titer (<10) in the not-ill group suggests that those persons who reported not being ill had, in fact, not been infected.

TABLE 1

ANTIGEN	GEOMETRIC MEAN TITER		t-test results
	Not Ill	Convalescent	
Hong Kong	8	28	P <0.01
Tokyo A2	22	28	not significant
Singapore B	30	48	not significant

Two hundred and eighty two (282) or 74.5 percent of the employees returned the questionnaire. The results were interpreted using the following criteria: "Complete" Immunization - one or more vaccinations since July 1963, plus a booster dose in October 1968. No immunization - no vaccination since July 1963. Partial immunization - one or more vaccinations since July 1963, but not meeting criteria for "Complete" Immunization. Persons were judged to have had clinical influenza if they had four or more of the following six criteria: fever; chills; myalgia; cough; chest pain; and illness for more than four days.

Individuals were called "Completely Healthy" if they had no symptoms or signs whatsoever. An "Indeterminate" category included those who had some symptoms or signs but not enough to meet the criteria for "Clinical Influenza." The epidemic curve (Figure 17) demonstrates a sharp peak in the number of cases in the 46th week (ending November 16, 1968).

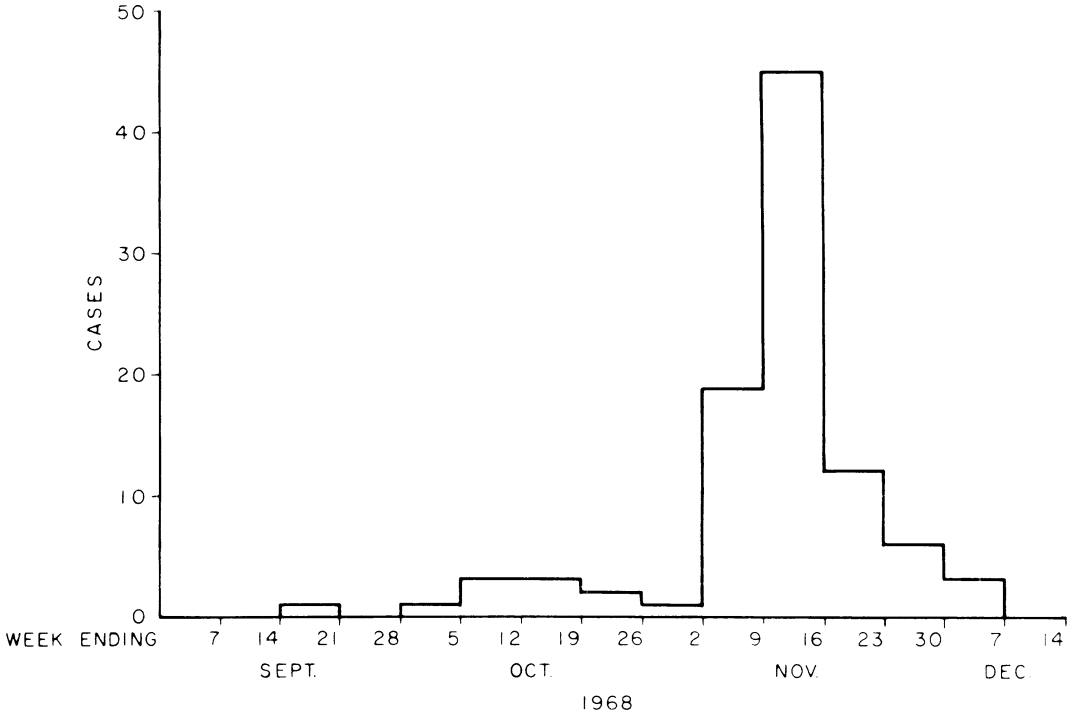
There was no evidence that vaccination with commercially available polyvalent vaccine gave protection against the Hong Kong strains (Table 2).

TABLE 2

	"COMPLETE" IMMUNIZATION	PARTIAL IMMUNIZATION	NO IMMUNIZATION	TOTAL
Clinical Influenza	73 (55.0%)	34 (46.5%)	20 (26.3%)	127
Completely Healthy	29	24	25	78
Indeterminate	31	15	31	77
Total	133	73	76	282

(Reported by: Robert W. Sherwood, M.D., M.P.H., Director of Division of Preventive Medicine, Bryon Haslam, Field Health Representative, Utah State Division of Health; Paul Mayberry, M.D., Director, Grand County Department of Health, Utah; and Spotswood L. Spruance, M.D., EIS Officer.)

Figure 17 INFLUENZA-LIKE ILLNESS IN MINING COMPANY EMPLOYEES, UTAH, SEPTEMBER 1-DECEMBER 14, 1968



C. PNEUMONIA AT GRADY MEMORIAL HOSPITAL, ATLANTA, 1968-69

The influenza epidemic of the winter of 1968-69 was first noted at Grady Memorial Hospital, Atlanta, during the second week of December, 1968, when emergency medical clinic visits increased from 1038 for the week beginning December 1 to 1500 for the week beginning December 8. These subsequently reached a peak of 2200 during the week beginning December 22. There was an increase in pneumonia admissions to the medical service two weeks after the increase in emergency medical clinic visits, from an average of 8 per week to 27 for the week beginning December 22. During the next two weeks 100 patients with pneumonia were admitted to the medical service. Pneumonia admissions for the week beginning January 12, 1969, then decreased to 12 (Figure 18).

In order to study the bacterial etiology of pneumonia in the face of an ongoing influenza epidemic, a three-week interval at the height of the epidemic (December 22, 1968 - January 11, 1969) was designated as an intensive study period. Special temporary pneumonia wards were opened and in contrast to usual policy, all patients with a presumptive diagnosis of pneumonia were admitted to the hospital. Bacteriologic data were available on 100 of 127 patients admitted during the three week influenza study period, and, for comparative purposes, from 203 of 301 patients admitted to the medical service with an admission diagnosis of pneumonia for the year ending June 30, 1968.

The most striking difference during the study period was the four-fold increase in staphylococcal pneumonia (from 5% to 20% - Table 1). Furthermore, Staphylococcus aureus was considered the etiologic agent in only 7 percent of pneumonia cases admitted during the first three weeks of December 1968, (before the epidemic) and the last three weeks of January 1969, (after the epidemic). There was also an increase noted in pneumonia due to Hemophilus influenzae during the 1968-69 epidemic. For comparison, although an epidemic of A2 influenza had been documented during December 1967, and January 1968, no significant shift in the etiology of bacterial pneumonia was noted at that time.

TABLE 1
Bacterial Etiology of Acute Pneumonia Admissions

	July 1, 1967 - June 30, 1968 203 Etiologically Proven Pneumonias	December 22, 1968 - January 11, 1969 100 Etiologically Proven Pneumonias
	PERCENT	PERCENT
D. Pneumoniae (pure culture)	51	39
S. aureus (pure culture)	5	20
S. aureus + another organism	3	6
H. Influenzae (pure culture)	6	11
Other	34	24

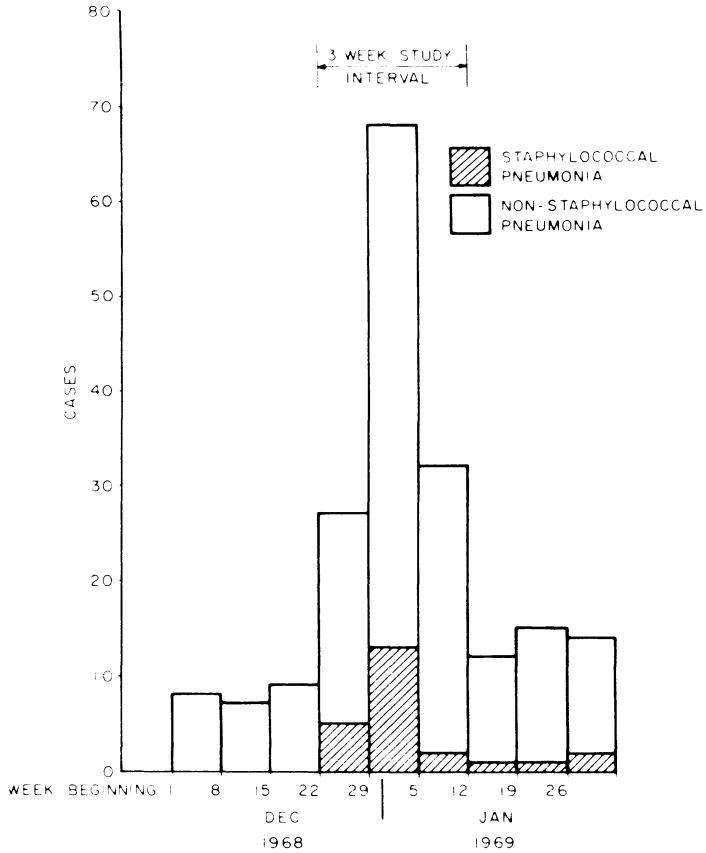
There were 27 deaths among the 127 patients admitted with pneumonia from December 22, 1968, to January 11, 1969, a case fatality rate of 21 percent, similar to the 23 percent mortality noted during the influenza epidemic of 1967-68 and the 25 percent mortality of all pneumonia cases admitted to the medical service for the year July 1, 1967, to June 30, 1968. No difference in age of the decedent or number of decedents with underlying illnesses was noted.

Serologic evidence for influenza was demonstrated in 75 percent of 44 pneumonia patients tested during the epidemic. This evidence consisted of a four-fold change in hemagglutination-inhibition titer to A2/Hong Kong/68 in five patients, a four-fold change in soluble CF Type A antibody in three cases, and a soluble CF Type A antibody titer of 1:32 or greater in 25 cases.

Twenty patients with a diagnosis of staphylococcal pneumonia were admitted to the hospital between December 22, 1968, and January 11, 1969 (Figure 18). All 11 patients with staphylococcal pneumonia who had sera available for testing had presumptive evidence of recent infection with a Hong Kong strain of influenza virus. During the 12-month period commencing July 1, 1967, only 11 patients with staphylococcal pneumonia had been admitted and there had been no concentration of cases during the winter of 1967-68.

The median age of the 20 patients with staphylococcal pneumonia during the recent epidemic was within the interval 40-49 years, a downward shift from the median age of the staphylococcal pneumonia patients seen during the preceding year which was within the 60-69 year age interval. Forty percent (8) of the staphylococcal pneumonia patients during the 3-week study period had no demonstrable underlying illness; whereas, all of the staphylococcal pneumonia patients and 82 percent of all the pneumonia patients during the 1-year period showed evidence of underlying predisposing disease. Furthermore, during the 1968-69 epidemic, bacterial pneumonia patients with non-staphylococcal etiologies had the usual high percentage of underlying disease.

Figure 18 189 ACUTE PNEUMONIA ADMISSIONS BY WEEK, GRADY MEMORIAL HOSPITAL DECEMBER 1, 1968 - JANUARY 31, 1969



Six patients with staphylococcal pneumonia on admission died, a case-fatality rate of 30 percent, not significantly differing from the staphylococcal pneumonia mortality of 36 percent noted from July 1967 to June 1968. However, the median age of the six patients dying with staphylococcal pneumonia was 43 years, considerably lower than the median age of patients dying with bacterial pneumonia in general or with staphylococcal pneumonia the previous year. Five of the six fatal cases of staphylococcal pneumonia did have serious underlying illnesses. Four of the six patients were noted to be cyanotic prior to death; and in the two patients in which arterial PO_2 was obtained, it was depressed. Four of the six patients died within 24 hours of admission.

In vitro antibiotic sensitivity tests (Kirby-Bauer technique) were performed on 19 of the isolates of S. aureus. Fourteen were resistant to penicillin and ampicillin; two of thes isolates were also resistant to tetracycline and one was resistant to chloramphenicol. All isolates were sensitive to cephalothin, oxacillin, erythromycin, lincomycin, and kanamycin. Eight of the isolates were phage-typed. No one bacteriophage type predominated. Type 52/52A/80/81 was isolated from one patient; type 52/52A/80 was isolated from one patient; and type 80/81 was isolated from one patient.

During the epidemic five cases of hospital-acquired staphylococcal pneumonia were also recognized. Two of these patients, both of whom had serious underlying illnesses, died; and all isolates were penicillin resistant. Nosocomial staphylococcal pneumonia had not been a problem before this epidemic or since.

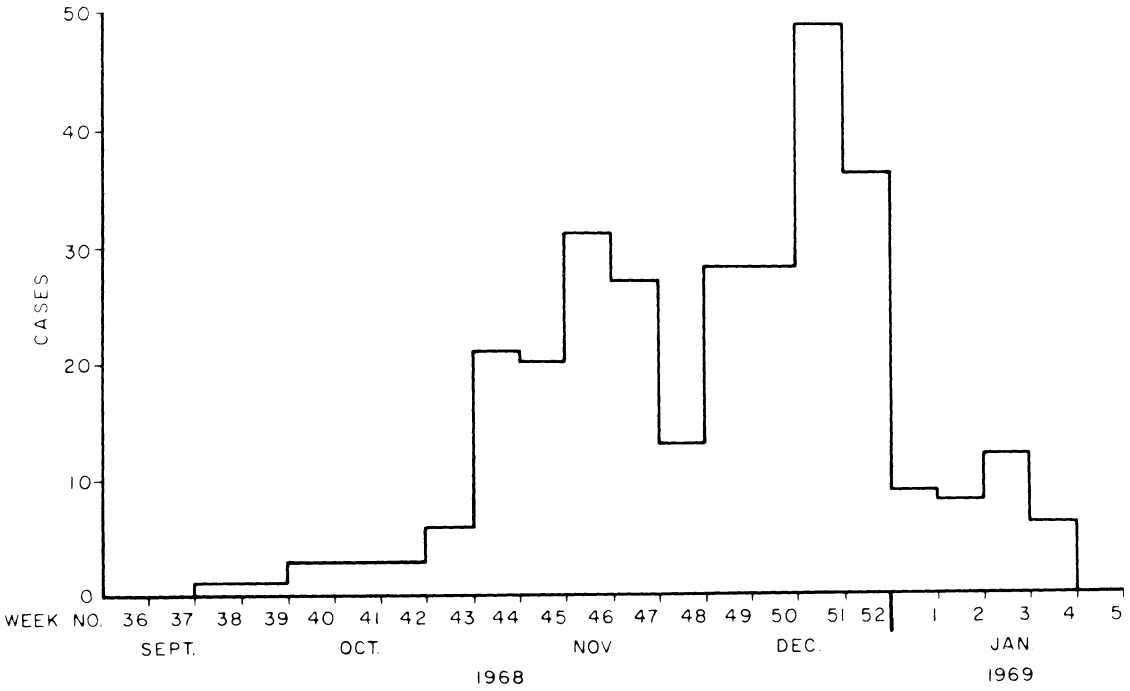
In summary, a significant increase in pneumonia admissions at Grady Memorial Hospital was noted during the recent Hong Kong influenza epidemic that exceeded the increase seen the previous winter during an epidemic of A2 influenza. A marked increase in pneumonia of staphylococcal etiology was associated with the Hong Kong influenza epidemic. All admission staphylococcal pneumonia cases tested had evidence of recent influenza infection. The majority of the staphylococcal isolates (74%) were resistant to penicillin. The case-fatality rate was not increased in the staphylococcal cases. An increase in hospital-acquired staphylococcal pneumonia was also associated with the epidemic.

(Reported by: William M. Marine, M.D., Associate Professor, Department of Preventive Medicine and Community Health, Assistant Professor, Department of Medicine, Stephen W. Schwarzmann, M.D., Fellow in Infectious Disease, Robert D. Sullivan, M.D., Senior Resident in Medicine, Grady Memorial Hospital, and Emory School of Medicine; and Jon Adler, EIS Officer.)

D. INFLUENZA IN HELENA, MONTANA

During November and December of 1968, the City of Helena experienced an epidemic of influenza-like illness (Figure 19) characterized by fever, myalgia, malaise, sore throat, headache, coryza, and cough. Predominant symptoms were prostration, weakness, and generalized aching. The weakness in some instances lasted 2-3 weeks. All age groups were affected. During the epidemic, four Hong Kong strains were isolated from Helena residents and serology was compatible with infection by a Hong Kong strain in 18 additional persons.

Figure 19 INFLUENZA-LIKE ILLNESS IN FAMILIES OF STUDENTS HELENA HIGH SCHOOL, MONTANA, SEPTEMBER 1, 1968-JANUARY 31, 1969



he usual daily absenteeism rates for all Helena schools are 2-3 percent. In mid-ovember, the junior and senior high schools were reporting absenteeism rates of 7-10 ercent, while the elementary schools were generally reporting absenteeism of 2-6 ercent. No school was forced to close because of student absenteeism, although there as occasionally a problem securing substitutes for the many ill teachers. In mid-ovember a cursory survey of the "downtown" businesses revealed absenteeism rates of 0-12 percent. None were forced to close because of absenteeism. The telephone ompany, in contrast, reported that it had only the usual absenteeism rate of less han one percent.

As the epidemic was fading in January, a questionnaire survey to assess household illnesses was conducted among the 1700 students at Helena High School. Three hundred and fifty questionnaires (20.6%) were returned in the allotted 5-day interval. The poor response presumably was due to imminent semester examinations and a severe blizzard which caused widespread absenteeism throughout the school system.

Twenty-nine questionnaires were returned incomplete. Of the remaining responses, 194 reported one or more cases of influenza-like illness in their families and 127 reported no illness. Influenza was defined as an illness having a duration of at least 2 days and characterized by (1) the occurrence of fever or chills plus one or more of the following - muscle aches, cough, marked fatigue, sore throat, runny nose; and/or (2) the occurrence of myalgia and one or more respiratory symptoms.

After application of these criteria, 448 out of 1547 persons reported on by the respondents were judged to have had an influenza-like illness. There was no significant difference in the occurrence of influenza-like illness by age or by sex (Table 1). The 448 cases were then divided into index and secondary cases in families where dates of onset were sufficiently reported. The first case in a family was considered the index case, or if two occurred simultaneously, both were considered to be co-primaries.

TABLE 1

INFLUENZA-LIKE ILLNESS
Helena, Montana
Attack Rate per 100
By Age and Sex

AGE GROUP	MALE	FEMALE	TOTAL
0-4	31.2	41.1	33.3
5-9	21.6	20.4	21.3
10-14	27.4	24.6	24.4
15-19	22.2	32.2	27.6
20-29	23.3	28.2	25.3
30-39	32.4	27.6	28.8
40-49	40.2	30.2	34.9
50-59	39.7	31.4	36.0
60+	25.0	33.3	29.2
TOTAL	29.4	29.4	29.0

Any case following another in the same household within a 2-week interval was considered to be secondary. Cases occurring beyond this 2-week interval were considered to be second primary cases. Using these definitions, the primary attack rate of 27 percent and the secondary attack rate of 27 percent were not significantly different from the overall survey attack rate or from each other (Table 2). Among the primary cases, the attack rate for the 5-9 age group (7.6%) was significantly lower than the mean primary attack rate ($P < 0.01$). When the age distribution of the secondary cases was examined, no single age group differed significantly from the mean attack rate. There was a tendency towards lower attack rates in families of increasing size, but the relationship was not significant.

TABLE 2
INFLUENZA-LIKE ILLNESS
Helena, Montana
Primary and Secondary Attack Rates

AGE GROUP	PRIMARY ATTACK RATES	SECONDARY ATTACK RATES
0-4	13.3	46.1
5-9	7.6	28.6
10-14	19.8	20.8
15-19	30.8	20.4
20-29	24.4	29.0
30-39	31.0	27.5
40-49	33.1	35.0
50-59	34.6	27.8
60+	18.2	44.5
TOTAL	27.0	26.8

Of interest is that in February 1969, additional evidence of influenza caused by the Hong Kong strains was obtained in the Helena area. At this time the illness appeared to involve primarily elementary school children (the 5-9 group) who had a slightly lower attack rate during the initial occurrence of influenza in November and December. Few adults were involved and teacher absenteeism was normal. There was no evidence of infection by influenza B.

(Reported by: Mary E. Soules, M.D., Director, Division of Disease Control, Montana State Department of Health; and Martin D. Skinner, M.D., EIS Officer.)

E. INFLUENZA IN FAMILY MEMBERS OF MARYLAND STATE HEALTH DEPARTMENT EMPLOYEES

During the period December 2, 1968, through January 15, 1969, the Division of Communicable Diseases of the Maryland State Health Department kept daily records of absenteeism among the 546 health department employees in the Baltimore offices. The largest number of absences for influenza-like illness occurred during the last 2 weeks of December (Figure 20). At this time influenza activity due to the Hong Kong strain seemed to be at its peak in the metropolitan Baltimore area. One hundred and sixty one employees (29%) were absent from work for two or more consecutive days due to an influenza-like illness during the observation period. A questionnaire was sent to the 161 ill employees to determine in their households the number and distribution of influenza-like illnesses. Fifty-six percent (148 out 264) of the household members of ill employees had an influenza-like illness. All but 35 of these illnesses were within 7 days of another case within the same household. Age-specific attack rates were calculated for the household members (Table 1) and revealed a relatively flat age distribution. If anything there was a slight but not significant preponderance of illnesses in those persons age 20 and over.

(Reported by: John H. Janney, M.D., State Epidemiologist, Maryland State Health Department; and Harold Mellin, M.D., EIS Officer.)

Figure 20 ILLNESS ABSENTEEISM IN 546 EMPLOYEES, MARYLAND STATE DEPARTMENT OF HEALTH, DECEMBER 2, 1968-JANUARY 9, 1969

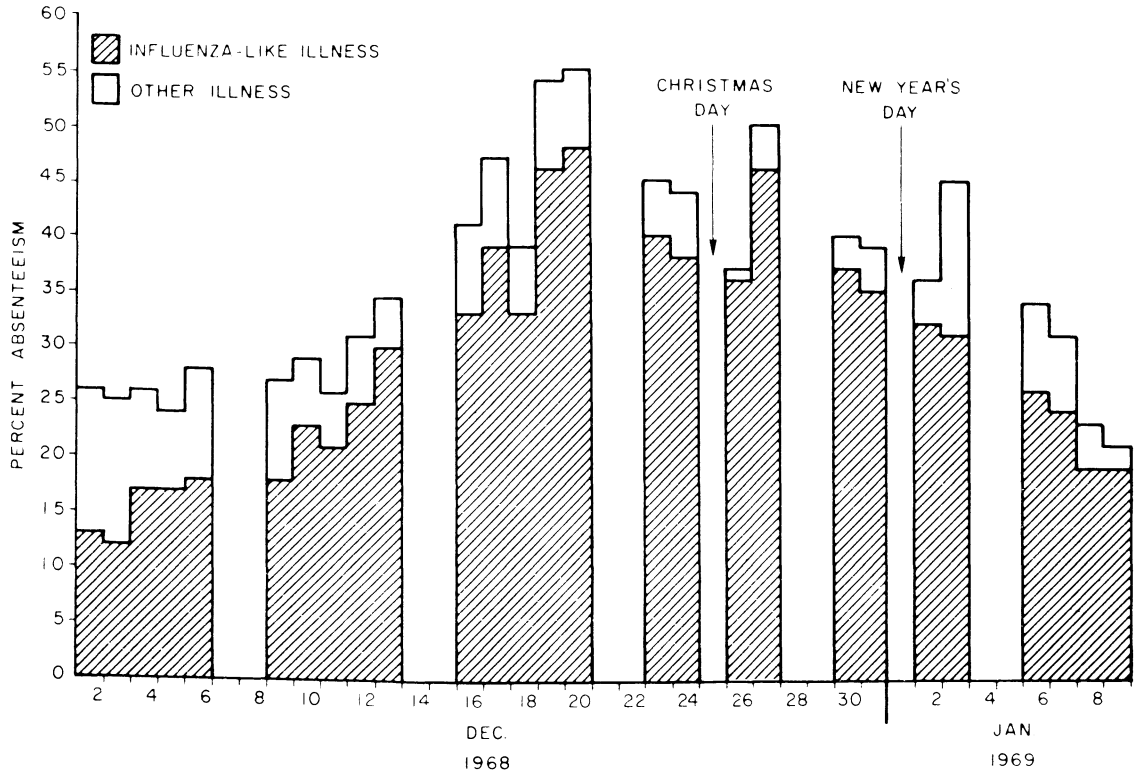


TABLE 1

INFLUENZA-LIKE ILLNESSES BY AGE
Household Members
of
Maryland State Health Department Employees

AGE	NUMBER ILL	NUMBER NOT ILL	ATTACK RATE
< 10	25	23	52%
10-19	32	33	49%
20-29	26	14	65%
30-39	7	12	37%
40-49	21	13	62%
50 and over	34	21	62%
< 20	57	56	50%
20 and over	88	60	59%

EDITORIAL NOTE:

In the Influenza Surveillance Report No. 76 (April 12, 1963) it was observed that the age-specific attack rates of influenza have not been constant from epidemic to epidemic. This has further been shown to be true for relative age-specific pneumonia-influenza excess mortality[1]. In 1957-58, peak attack rates and relative excess deaths were noted in the age group 10-19. In 1962-63, by contrast, these peaks were not observed, and the age-specific rates were relatively flat.

In 1968-69, a study of the age-specific attack rates was repeated in Kansas City, Kansas, using the same techniques which had been used in the same area in 1957. In contrast to the 1957-58 experience, in 1968-69 the age-specific attack rates were relatively flat. The two above reports on age-specific attack rates from other locations (Helena, Montana, and Baltimore, Maryland) tend to confirm this result.

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[1]Serfling, Robert E., Ida L. Sherman, and William J. Houseworth; Excess Pneumonia-Influenza Mortality by Age and Sex in Three Major Influenza A2 Epidemics, United States, 1957-58, 1960 and 1963. American Journal of Epidemiology, Volume 86, No. 2, pages 433-441, 1967.

VI. RECOMMENDATION OF THE PUBLIC HEALTH SERVICE ADVISORY COMMITTEE ON IMMUNIZATION PRACTICES

INFLUENZA

INTRODUCTION

The nationwide epidemic of A2 influenza in the United States in the fall and winter of 1968-69 showed the impact of a major antigenic change in the prevalent influenza viruses. The Hong Kong strain responsible for the epidemic was the most distinctive variant among A2 influenza viruses identified since initial appearance of the A2 subtype in 1957. The 1968-69 epidemic highlighted again the problems that are encountered in rapidly developing and producing sufficient quantities of vaccine incorporating a new antigen.

Forty-four States reported widespread outbreaks of Hong Kong strain influenza; in six, involvement was less extensive. In all nine geographic divisions of the country, excess pneumonia and influenza mortality peaked sharply in early January 1969.

In December 1968, Washington State reported an outbreak of type B influenza concurrent with Hong Kong strain A2. In January and February 1969, 18 additional States reported type B influenza; it was widespread only in States in the central part of the country. Unlike Hong Kong strain A2 influenza which affected all age groups, type B influenza illness occurred primarily in school-age children.

INFLUENZA VIRUS VACCINES

The Division of Biologics Standards, National Institutes of Health, regularly reviews influenza vaccine formulation, and, when indicated, recommends revision to include contemporary antigens. After characterization of the A2 Hong Kong virus in September 1968, a monovalent vaccine incorporating the new strain was recommended.

While some influenza vaccines have achieved 60 percent or greater effectiveness in protection against the same or closely related virus strains, vaccines in general civilian use often have not been this effective. Final data on vaccine field trials conducted in the 1968-69 influenza season are being compiled. Preliminary data indicate the monovalent Hong Kong strain vaccine was considerably less effective than would have been desirable.

For 1969-70, both standard and highly purified bivalent influenza vaccines will be available. The recommended adult dose will contain 400 chick cell agglutinating (CCA) units of Hong Kong strain antigen (A2 Aichi 2/68) and 300 CCA units of type B antigen (B Mass 3/66). The highly purified vaccine is equivalent in potency to the standard vaccine but contains less non-viral protein.

RECOMMENDATIONS FOR VACCINE USE

It is unlikely that there will be more than sporadic cases of influenza due to A2 strains in the 1969-70 season. Type B influenza may appear in areas where it did not occur in 1968-69.

Until good protection is provided consistently by influenza vaccine, it is not recommended for healthy adults and children.

Acknowledging its limited effectiveness, vaccine should be considered only for persons of any age with certain chronic debilitating conditions: 1) rheumatic heart disease, especially mitral stenosis; 2) such cardiovascular disorders as arteriosclerotic heart disease and hypertension, particularly with evidence of cardiac insufficiency; 3) chronic bronchopulmonary diseases, such as asthma, chronic bronchitis, cystic fibrosis, bronchiectasis, pulmonary fibrosis, pulmonary emphysema, and advanced pulmonary tuberculosis; or 4) diabetes mellitus or Addison's disease.

Although the indications of vaccination are less clear, older persons, who may have incipient or potential chronic disease, particularly cardiovascular and bronchopulmonary, should also be considered candidates for vaccination.

VACCINATION SCHEDULE

The primary series consists of 2 doses administered subcutaneously, preferably 6 to 8 weeks apart. (Dose volume for adults and children is specified in the manufacturers' labeling.) Persons at high risk who regularly receive influenza vaccines and had 1 or more doses of the monovalent vaccine containing Hong Kong strain antigen in the 1968-69 season require only a single full dose booster of bivalent vaccine. Immunization should be scheduled for completion by early December.

Local or mild systemic reactions to standard influenza vaccines are common. They occur in up to 50 percent of adults and appear to be related primarily to the non-viral components of the vaccine.

Individuals who should receive influenza vaccine but have had severe local or systemic reactions to the standard vaccine might be given a highly purified vaccine subcutaneously.

PRECAUTIONS

Influenza vaccine should not be administered to anyone who is clearly hypersensitive to eggs because the vaccine viruses are grown in embryonated chicken eggs.

STATE EPIDEMIOLOGISTS AND STATE LABORATORY DIRECTORS

Key to all disease surveillance activities are the physicians who serve as State epidemiologists. They are responsible for collecting, interpreting, and transmitting data and epidemiological information from their individual States; their contributions to this report are gratefully acknowledged. In addition, valuable contributions are made by State Laboratory Directors; we are indebted to them for their valuable support.

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