

I. Summary of Information

Although influenza continues to occur frequently in closed groups, there is no evidence of community-wide outbreaks except in California, Louisiana, and Mississippi. The influenza situation in Louisiana is discussed briefly in a progress note on the Tangipahoe Parish epidemic. Migrant laborers from Mexico and the Bahamas have been involved in several localized epidemics in this country.

One isolation of type B influenza in San Diego is reported.

Four new influenza-associated deaths are described.

To date 5,430,442 ml. of influenza vaccine have been released for use.

In the new miscellany section are items on vaccine-associated deaths, chemical prophylactic agents, proper refrigeration of throat washings.

Explanation of new influenza and pneumonia excess mortality graphs and a summary of the excess mortality data from the Manila epidemic are presented in the appendices.

II. Epidemic and Case Reports

16-A. NEW YORK, Genesee County

(Reported by Dr. Julia Freitag, Epidemiologist, New York Department of Health.)

There is an outbreak of influenza-like illness in "Oak Orchard Village" farm labor camp, Genesee County. Onset of cases was September 2 and, as of September 3, there were 21 cases among 259 male, adult Bahaman farm laborers. The camp also contains 84 negro migrant laborers, none of whom are ill. Laboratory studies are underway.

16-A. NEW YORK, Cattaraugus County

(Reported by Dr. Robert M. Albrecht, New York State Department of Health.)

An outbreak of influenza-like illness has occurred among 60 Alabama negro migrants at Scobey Hill Labor Camp. Onsets ranged from August 31 through September 5. Many have recovered and gone back to work within a week. Paired sera have been obtained.

16-B. TENNESSEE

(Reported by Dr. Cecil Tucker, Tennessee Department of Health.)

No extensive outbreaks of influenza occurred in Tennessee during August; however, the State Laboratory has confirmed 15 sporadic cases by HI tests. Since the beginning of September, over 500 sporadic cases have been reported.

16-C. MINNESOTA

(Reported by Dr. D. S. Fleming, Minnesota Department of Health.)

Twenty-two cases of influenza-like illness have occurred in 123 Bahaman cornpickers, who arrived in Minnesota September 4. Two cases were ill before arrival. Symptoms included acute onset of fever of 100-103, chills, headache, malaise, weakness, non-productive cough, chest pain, occasional stiff neck and back, rapid recovery. The Bahamans left Nassau August 28 by plane, proceeded by bus from Palm Beach, Florida, to Winchester, West Virginia, then to Washington, D.C., from where they flew to Minneapolis. Eighteen of the cases have occurred among 61 workers in Meeker County and 4 cases among 62 workers in McLeod County. Eight throat washings and 12 acute sera have been obtained.

16-D. CALIFORNIA, El Centro

(Reported by Dr. Ruth Moldenhauer, California Department of Public Health.)

Since August 30, over 4000 Mexican migrant workers have been screened at El Centro. At least 400 have been put to bed with flu-like disease. Diarrhea has been a common symptom. Blood specimens are being collected and a new screening center has been established at Empalme, Mexico, to prevent admission of sick migrants to El Centro.

16-E. FLORIDA, Gainesville

(Reported by Dr. J. O. Bond, Florida State Board of Health.)

About 60 members of the University of Florida football team have come down with influenza since late August, forcing cancellation of the September 20 game with U.C.L.A. A 66% attack rate among high school football teams is reported in Cole County, Missouri.

16-F. NEW YORK

(Reported by Dr. M. Greenberg, New York City Department of Health.)

The following information has been reported on ships and planes arriving in New York from Europe.

<u>Vessel or Plane</u>	<u>Date of Arrival</u>	<u>Persons Aboard</u>	<u>Total Influenza</u>
S.S. Saturnia	8/28/57	Not available	3
S.S. Olympia	9/ 3/57	1637	80
U.S.S. General Patch	9/ 6/57	896	21
S.S. Cristofa Columbo	9/ 9/57	1794	30
S.S. Ille de France	9/10/57	2075	8
American Field Service Airplane	9/ 6/57	73	2

16-G. NEW JERSEY

(Reported by Dr. Daniel Bergsma, New Jersey Department of Health, and Dr. Sanford Farrer, Epidemic Intelligence Service.)

Forty-five cases of influenza have been reported among 250 fishermen in a small fleet off southern New Jersey. Most of the cases are among negroes, who return home to Baltimore and the South every two weeks. One boat with 29 men had 20 cases. A wife and two children of an employee have developed secondary cases. A typical flu syndrome with temperature of 99-104 is reported, but two men have been hospitalized with pneumonia.

16-H. SOUTH DAKOTA

(Reported by Dr. G. J. Van Heuvelen, South Dakota Department of Health, and Dr. Eugene Pirtle, University of South Dakota School of Medicine.)

Low-grade outbreaks of influenza are in progress in adjacent Clay and Yankton Counties in southeast South Dakota. A total of 6 cases has been confirmed serologically in paired specimens.

16-I. COLORADO, San Luis Valley

(Reported by Dr. R. L. Cleere, Colorado Department of Public Health, and Mr. Ralph C. Barnes, Communicable Disease Control Services, Region VIII.)

Between 90 and 125 cases of flu have been reported among 545 Mexican migrant workers in the San Luis Valley. The outbreaks began on August 28 in several of the labor camps. Initially, there was hysteria and workmen, not actually sick, stayed away from work and sought medical attention. Two cases are reported to have passed bloody urine and one boy, who apparently returned to work too soon, contracted pneumonia. Acute and convalescent sera will be obtained.

16-J. CALIFORNIA, San Diego

A strain of influenza virus type B was isolated from the throat washing of a naval recruit, taken on June 17, 1957. The convalescent serum of this individual showed a fourfold C.F. rise in antibody with the B/GL/54 antigen and no rise with Jap/305/57 antigen. The strain was typed by the H.I. test with B/GL/54 chicken antisera received from CDC. Dr. Loosli is certain that this does not represent a laboratory contaminant, particularly since no type B antigen has been grown in the lab in several years.

NOTE: This is the first known isolation of type B influenza since the present Asian strain type A epidemic began; and it is hoped that other investigators will make routine and periodic tests for type B. In this way, more precise data on the coexistence of different types and strains during epidemics may be obtained.

16-K. NEVADA

(Reported by Dr. Daniel J. Hurley, Nevada State Department of Health.)

To date, 244 cases of flu-like illness have been reported in the state. Confirmation of Asian strain has been made in one case.

16-Q. CALIFORNIA, San Jose (not included in summary tables)

(Reported by Dr. R. M. Moldenhauer, California Department of Public Health.)

Two outbreaks of influenza-like illness at Camp Saratoga, near San Jose, occurred during the summer. The second of these, between August 5-19, involved 45 persons of 150 present. One of those attacked was the 16-year-old boy reported as Cal. 9 under influenza-associated deaths.

III. Progress Reports

16-L. CALIFORNIA, Davis

(Reported by Dr. R. M. Moldenhauer, California Department of Public Health.)

A survey at the Davis Girls Conference (1-G, 3-J) on June 24 revealed that 224 of the 391 girls present had influenza. Because many girls became ill after the original survey, a questionnaire was sent to the 167 girls not initially sick. Ninety-eight percent of the questionnaires were completed and returned. These revealed that 125 more girls had developed flu after the first survey, either at camp or upon returning home. This raised the over-all attack rate at the conference from 57 to 89%. There was a 6% attack rate among 389 family contacts of the 125 girls. Among families of the 38 girls not reprot-clinical illness, two cases developed, indicating inapparent illness. A tabulation of symptoms reported on the questionnaire by 125 girls is below. This information is not available for the 224 first reporting ill.

<u>Symptom</u>	<u>Percent Reporting</u>
Fever	87
Cough	83
Headache	81
Sore throat	73
Myalgia	64
Diarrhea	17
Vomiting	8

16-M. FUERTO RICO, San Juan

(Reported by Dr. Guillermo Arbona, Puerto Rico Department of Health.)

The estimate of possible number of cases for the week ending September 6 is 48,900 and the disease is in epidemic form around San Juan. Antibody rise to Jap 305 has been confirmed from three paired specimens, all from the same family, with contacts from New York.

16-N. MISSISSIPPI, Sunflower County

(Reported by Dr. A. L. Gray, Mississippi State Board of Health.)

Many influenza-like illnesses occurred among negroes on one plantation in this county in mid-July. Serologic confirmation has been obtained by C.F. test. There is a general impression of widespread, though not epidemic, influenza in Mississippi.

16-O. GRINNELL CONFERENCE (Iowa)

(Reported by Dr. E. G. Zimmerer, Iowa State Department of Health.)

Table IV--the Grinnell Conference data--is presented for the last time in this report. Most of the information relating to the conference has now been presented. Some final additions, reported by Dr. Zimmerer, bring the table up to date.

Early in the summer, the relatively small number of cases of influenza resulting from the conference stood out and the spread to other states was not difficult to follow. However, dissemination of influenza is now extensive throughout much of the United States. The Grinnell data retains a considerable historic interest, but its current significance has decreased.

16-P. LOUISIANA

(Reported by Dr. J. D. Martin, Louisiana Department of Health, and Drs. D. E. Carey and F. L. Dunn, Epidemic Intelligence Service.)

Current Charity Hospital data will not be available in time for this report. New Orleans, however, appears to be experiencing a continually increasing incidence of influenza-like illness. Actual count of flu-like illness at Charity Hospital OPD through August 27 is 2600.

Household survey data from Tangipahoa Parish are being intensively studied at present. Progress notes on this work will appear in the Report from time to time.

The survey was performed by distributing a form to high school students in five schools and to workers in one industry. These forms were filled out immediately and handed back. Study hours were used by the students for this purpose. The students and workers reported on their own illness and that of all their household members.

The students and workers who filled out the forms were called index persons. They numbered 1655, and 7381 other household members were covered in the survey. The total sample, therefore, was 9036 individuals of a total parish population of 60,820. Of this group of 9036 persons, 2915 had influenza-like illnesses between June 1 and August 17. Almost all of these illnesses occurred between mid-July and mid-August, a four-week period. This represents an attack rate of 32%.

The schools in the survey included two white and three negro schools, with a parish-wide geographic distribution. A range of economic levels is represented by the schools as well. In addition, the centrally located industry draws workers from a large area in the parish. The sample of 9036 persons thus represents a good sample of the parish population as a whole. Projecting the 32% attack rate for the total population of 60,820 gives a figure of 19,500 persons with influenza-like illness during the study period. On this basis an estimate of 15-20,000 cases from the parish has been presented in Table I.

IV. DEATHS - Deaths Specifically Associated with Influenza

To date 14 deaths associated with influenza have been reported. Nine have been reported from California, 3 from Louisiana. These two states apparently have been most heavily involved by influenza during the summer months.

It is noteworthy that most of these deaths have occurred in teenagers and young adults. No clear-cut influenza-associated deaths have yet been reported in persons over 65 or under one year of age. Ages of the 14 deaths so far reported: 2, 15, 16, 17, 18, "teenage," 20, 21, 25, 26, 33, 44, 57, 58. Only two deaths are known to be associated with previously existing disease.

Four new reports are presented below.

New Reports:

Cal. 10 (Reported by Dr. R. M. Moldenhauer, California Department of Public Health.)

A teen-age girl developed a typical influenza-like illness about August 23 in Berkeley, California. The initial illness lasted three days. On the fourth day the patient seemed better; but suddenly became confused and manic in behavior and died within 24 hours, on August 27. A post-mortem blood specimen produced a titer of 1:256 for type A influenza by CF. Autopsy revealed "post influenzal pneumonia" and "encephalitis and brain stem involvement." Detailed laboratory studies are in progress.

Cal. 11 (Reported by Dr. R. M. Moldenhauer, California Department of Public Health.)

The death of a 25-year-old male has been reported from San Francisco. An influenza-like illness of three days duration was followed by a complicating pneumonia resulting in death six days after onset of the influenza symptoms. Autopsy revealed "hemorrhagic pneumonia." Laboratory specimens were obtained.

La. 2 (Reported by Dr. J. D. Martin, Louisiana Department of Health.)

A 17-year-old female, five months pregnant, developed a typical influenza-like illness on August 15. By August 19 coughing was prominent and painful, high temperature was persistent, and sputum was bloody. She expired August 22. Autopsy was performed and specimens are under study.

1a. 3 (Reported by Dr. J. D. Martin, Louisiana Department of Health.)

A 26-year-old male from St. Louis, Missouri, was visiting in Hammond, Tangipahoa Parish, in late August when he and his entire family developed an influenza-like illness. This occurred during the period of epidemic influenza (Asian strain confirmed) in the parish. The young man expired about one week after onset of first symptoms in spite of vigorous therapeutic efforts. There was a four-year history of rheumatic heart disease and the patient had been on digitals for this period of time. However, pneumonia was the complication which apparently led to death rather than cardiac difficulty. Autopsy was not performed but throat washings were collected. Sputum culture (the sputum was bloody, mucoid) revealed hemolytic staphylococci.

Additions to previous reports:

N.Y. 1 (Reported by Dr. Morris Greenberg, New York City Department of Health)

The Staphylococcus aureus recovered from the lungs of this fatal case of influenza has been phage typed as 52, 3B, 7. It was found to be sensitive to penicillin and chloramphenicol, very sensitive to tetracycline and neomycin, moderately sensitive to streptomycin, and slightly sensitive to bacitracin. He had received antibiotic therapy.

Cal. 9 (Reported by Dr. R. M. Moldenhauer, California Department of Public Health.)

Phage typing of the coagulase positive Staphylococcus aureus obtained from this patient revealed the pattern: 29, 44A, 52. Sensitivity testing by the disc method showed resistance to penicillin; sensitivity to streptomycin, chloramphenicol, and erythromycin. Other antibiotics were not tested.

V. Influenza Vaccine Production and Distribution

Influenza Vaccine Released
(Totals through September 11, 1957)

<u>Pharmaceutical Concern</u>	<u>Monovalent Asian strain</u>		<u>Polyvalent with Asian strain</u>	
Lederle	1,396,390 ml	231,810 ml		
Lilly	228,507	-----		
Merck, Sharpe & Dohme	571,350	-----		
National Drug	1,249,820	1,292,205		
Parke Davis	36,250	-----		
Pitman Moore	424,110	-----		

Total released to date: 5,430,442 ml.

Shipping Destination:

Department of Defense	1,818,120 ml.
Commercial channels	3,612,322

VI. Miscellany

A. Reports of deaths associated with Asian strain influenza vaccination

1. (Reported by Dr. N. J. Rose, Illinois Department of Public Health.)

A brief report has been received of a sudden death following flu vaccination, which occurred in a male Chicagoan early in the second week of September. The initial impression was that the man had succumbed to an entirely coincidental heart attack. Detailed investigations are in progress.

2. (Reported by Dr. A. L. Gray, Mississippi State Board of Health.)

A 17-year-old white female of Carthage, Mississippi, expired on August 30, four days after receiving Asian strain vaccine. An autopsy was not performed. Major hypotheses of cause of death, listed in order, were: 1. Embolism from the heart to the brain (with SBE a definite possibility). 2. Mycotic aneurysm of the brain. 3. Congenital aneurysm in the brain.

The girl was a known rheumatic fever victim. Her first attack occurred at age seven. Several months before her death she experienced an exacerbation of her illness, was hospitalized, and sent home a week later on complete bed rest. A grade IV murmur was noted at the time of hospitalization. She improved at home.

On August 26, the patient did not feel well and remained in bed. At 7:30 p.m. on that day, one ml. of monovalent influenza vaccine was administered subcutaneously. Twenty to thirty minutes later the girl reported to her mother "that she felt worse and felt as though she would die." She then collapsed and became unconscious. About 15 minutes later, convulsive movements of the entire body appeared and examination revealed Cheyne-Stokes respiration; right pupil constricted; choked disc in left eye; tachycardia; and elevated blood pressure. A stormy hospital course, consistent with embolism to the brain, followed before expiration.

There was no history of egg allergy, nor was the patient disturbed by the injection itself.

The consensus was that the vaccination was a coincidental incident. Only the premonitory warning of the patient and the time of onset of collapse and unconsciousness (20-30 minutes after vaccination) suggest the possibility of a vaccine reaction.

B. Use of chemical agents

Intranasal sprays of iodine solution for prophylaxis of Asian influenza are reported in Antiseptic (Madras, India, August 57). The study was done in school children and suggested favorable results, but results were admittedly inconclusive because adequate controls were lacking. This is not the first time chemical agents have been used against influenza. During

the 1918 epidemic a favorite was silver nitrate solution, either intravenously or intranasally. Careful investigation has failed to prove the value of this agent. Many other compounds have been employed during the succeeding years, with uniformly negative results. Andrews, King, and van den Ende, Journal of Pathology and Bacteriology, 55:173, 1943, list 115 different chemicals which they tried experimentally against type A influenza, without success. This and other reports in the literature cast doubt on the prophylactic or therapeutic value of chemical agents in influenza.

C. Temperature of specimens

There is some misunderstanding about the proper temperature for storage or shipment of throat washing specimens. The specimens should be either frozen at -70°C (direct contact of tube with dry ice) or kept above freezing at about 4°C . The alternate formation and melting of minute ice crystals at temperatures only slightly below freezing tend to destroy the power of the virus to multiply and make its isolation difficult or impossible. Best isolations can be made from fresh specimens taken directly to the laboratory. The above temperature specifications do not apply to serum specimens which are tested for antibody rather than living virus.

VII. Summary Tables - Cases and Outbreaks

TABLE I

Confirmed Outbreaks and Cases of Influenza Due to Asian Strains, United States (September 5-12)
 Additions and revisions since Report No. 15 -- See Report No. 15 for complete listing.

Dates of Outbreaks	Location	Type of Population	Population at Risk	No. Ill	Deaths	Lab. Diagnosis by		CDC Influenza Report Number
						Virus Isolation	Serology	
August	TENNESSEE	General	15 sporadic cases		0		Yes	16-B
August	SOUTH DAKOTA Clay County Yankton County	General	6 sporadic cases		0		Yes	16-H
Late Aug.-- early Sept.	NEVADA	General	244 sporadic cases reported		0	Yes (one iso- late)		16-K
Late Aug.-- Sept. 6	PUERTO RICO	General	Total island population	Estimated 48,900	0		Yes	16-M
Mid-July	MISSISSIPPI Sunflower Co.	Plantation	?	77	0		Yes	16-N
Mid-July-- early Sept.	LOUISIANA Grant Parish Tangipahoa Par.	Girls' camp Entire population	60 60,820	30 15-20,000	0 2	Yes Yes		4-B 10-A 16-P 11-H 15-M
	New Orleans	Charity Hospital OPD patients	Many cases (3 virus isolations)		0	Yes		

TABLE II

Unconfirmed Influenza-Like Illness, Outbreaks - United States (September 5-12)
 Additions since Report No. 15 -- See Report No. 15 for complete listing.

Dates of Outbreaks	Location	Type of Population	Population at Risk	No. Ill	Deaths	Specimens Obtained		CDC Influenza Report Number
						Throat Washings	Blood	
Aug. 31-- Sept. 5 Early Sept.	NEW YORK Cattaragus Co. Genesee Co.	Migrant labor camp Migrant labor (Bahaman)	60 259	60 21	0 0	?	Yes Yes	16-A 16-A
Sept. 4-7	MINNESOTA Meeker and McLeod Cos.	Migrant labor (Bahaman)	123	22	0	Yes	Yes	16-C
Aug. 30-- Sept. 10 Sept. 1-10	CALIFORNIA El Centro FLORIDA Gainesville	Mexican migrant laborers Football team	4000?	400?	0	?	Yes	16-D
Early Sept.	NEW YORK New York City	Passenger vessels from Europe	?	65 142	0 0	?	?	16-E 16-F
Sept. 1-6	NEW JERSEY Wildwood	Fishermen (fish- ing fleet)	250	45	0	Yes	?	16-G
Late Aug.-- early Sept.	COLORADO San Luis Val- ley	Mexican migrant laborers	545	90-125	0		Yes	16-I

TABLE III

Outbreaks of Febrile Respiratory Diseases -- Etiology Other Than Influenza* or No Specimens Obtainable
 (September 5-12, 1957)

Additions since Report No. 15 -- See Report No. 15 for complete listing

Date of Outbreaks	Location	Type of Population	Population at Risk	No. with Influenza-Like Illnesses	Deaths	Specimens Obtained		CDC Influenza Report Number
						Throat Washings	Blood	
June 17	CALIFORNIA San Diego	Navy recruit	Single case		0		Influenza Type B (GL 1954) isolated	16-J

*Asian Type

Reported Influenza-like Illness Among Returning Delegates from Grinnell (Iowa) Conference
Through September 12, 1957

(Final Presentation of this Table)

TABLE IV

Location	No. Ill After Conference	No. of Secondary Cases	Lab. Confirmation Asian Strain Influenza	CDC Influenza Report Number
Grinnell, Iowa	(200+ Ill of 1958 at Conference)		Yes	1-J
KENTUCKY	24	--	Yes	2-B
INDIANA	2+	--	No	2-C
ILLINOIS	6+	--	Yes	11-D
NEW MEXICO	15	2	No	3-B
CONNECTICUT	3	1	Yes	3-C, 8-D
NEW YORK	4	2	Yes	5-D, 8-D
MINNESOTA	18	14	No	16
COLORADO	1	--	No	--
NORTH CAROLINA	3	4	No	--
MARYLAND	1	--	No	--
WISCONSIN	2+	--	No	--
IDAHO	5+	--	No	--
PENNSYLVANIA	34+	3	Yes	8-D, 13-D
OREGON	2	--	No	--
CALIFORNIA	0.53	4	No	--
ARKANSAS	1	--	No	16
MISSISSIPPI	1	--	No	16
NEVADA	1	--	No	16
RHODE ISLAND	1	--	No	16
VIRGINIA	2	--	No	16

TABLE VI (Continued)

State and No.	Locale of Death	Age	Sex	Date of Onset	Date of Death	Diagnosis of Influenza	Contributory Factors and/or Reported Cause of Death	CDC Influenza Report Number
N.Y. 1	New York City	18	M	Aug. 13	Aug. 14	Virus Isolation	Hemorrhagic Pneumonitis**	12, 13
R.I. 1	Newport	15	M	Aug. 17	Aug. 23	Virus Isolation	Hemorrhagic Pneumonitis, Intra-abdominal Myocarditis	15
La. 1	Tangipahoa Parish	2	M	July 30	July 31	Clinical (fam-ily outbreak)	DOA - Febrile Respiratory Illness	11, 13
La. 2	New Orleans	17	F	Aug. 15	Aug. 22	Clinical	Hemorrhagic Pneumonia**	16
La. 3	Tangipahoa Parish	26	M	Late August	August	Clinical (fam-ily outbreak)	Pneumonia Rheumatic Heart Disease	16

**Post-mortem examination performed.

TABLE V

Reported Outbreaks of Influenza-like Illness Among Boy Scouts Returning from the Jamboree
No Additions

See CDC Influenza Report No. 17 for Final Version of this Table
(No Further Presentations of Table V are Planned)

TABLE VI

DEATHS

Reported Instances of Deaths Specifically Associated with Influenza, United States
June 1, 1957 through September 12, 1957

State and No.	Locale of Death	Age	Sex	Date of Onset	Date of Death	Diagnosis of Influenza	Contributory Factors and/or Reported Cause of Death	CDC Influenza Report Number
Cal. 1	San Diego	58	M	July 7	July 16	Clinical (CF Test 1:64)	Bronchopneumonia**	9, 15
Cal. 2	San Diego	44	M	July 17	July 21	Clinical	Coronary occlusion	9
Cal. 5	Davis	57	F	June 29	July 4	Clinical	Acute Toxic Myocarditis**	1-G, 3-J 9
Cal. 6	Mare Island	20	M	June 10	June 13	Clinical	Bilateral Lobar Pneumonia with Consolidation (etiol. M. pyogenes var. aureus)**	9
Cal. 7	San Diego	33	F	July 8	July 15	Clinical	Hemorrhagic Interstitial Pneumonitis**	9, 15
Cal. 8	Monterey	21	M	July 21	July 24	Virus Isolation	Bilateral Lobar Pneumonia with Consolidation (etiol. M. pyogenes var. aureus)**	12, 13
Cal. 9	San Jose	16	M	Aug. 14	Aug. 17	Virus Isolation	Bilateral Lobar Pneumonia with Consolidation (etiol. M. pyogenes var. aureus)**	14
Cal. 10	Berkeley	?	F	Aug. 23	Aug. 27	Clinical (CF Test 1:256)	Pneumonia, Encephalitis and Brain Stem Involvement**	16
Cal. 11	San Francisco	25	M	?	?	Clinical	"Hemorrhagic Pneumonia" **	16

**Post-mortem examination performed.

Current Analysis of Influenza and Pneumonia Mortality

By Dr. Robert Serfling, with the assistance of Mrs. Ida Sherman, Mr. Arthur Cohen, and Mr. Paul Leaverton, Statistics Section, Epidemiology Branch, Communicable Disease Center.

This issue of the Influenza Surveillance Report includes a series of charts on current influenza and pneumonia mortality. Based on weekly figures from 108 cities throughout the United States, the charts will be continued through the coming influenza season.

Each chart includes a heavy line representing the "expected number" of influenza and pneumonia deaths each week and a broken line serving as an "epidemic threshold." Details of construction of the trend line and interpretation of the "epidemic threshold" are presented below.

A review of the charts indicates that incidence during 1957 has been generally somewhat lower than expected in the eastern part of the country, about normal in the South, and somewhat elevated in the West. In the Pacific Division incidence was elevated in the early part of 1957 but then dropped somewhat below normal levels. The rise in the last two weeks was largely concentrated in Los Angeles.

Table 1 presents the number of deaths in each Division during the last three weeks.

Method of Construction

Those familiar with Dr. Selwyn Collins' long series of influenza studies will recognize in the present charts a variant form of Dr. Collins' (Collins and Lehmann, 1953) presentations of excess influenza and pneumonia mortality. Although similar to Dr. Collins' procedures in concept, the present methods of calculation differ because of the necessity for estimating normal incidence in advance of each week rather than retrospectively.

In the present method, adjustments for seasonal variation and secular trends are based on the fortuitous circumstance that secular trend for a short recent period can be approximated by a simple linear regression. Thus, for each week in 1957, an estimate of expected incidence was obtained by a least squares estimate from a straight line fitted to the corresponding week in 1954, 1955, and 1956.

The procedure was simplified by using the same regression coefficient for each week of the year. Individual calculations were made for all 108 cities combined, and also for those in each of the nine geographic divisions of the United States. An analysis of variance indicated that, with one exception, calculation of a separate regression coefficient for different weeks of the year would afford no improvement over use of the same regression coefficient for each week. The exception was the West South Central Division; however, the improvement through the use of separate regression coefficients, although statistically significant, did not appear to be epidemiologically important, and hence a common regression coefficient was used for this Division, also.

Expected normal incidence, shown as a heavy line for each Division on the charts, was obtained by calculating an expected average level for thirteen successive four-week periods. These were then connected by a smooth curve.

Individual dots plotted for each week show the observed incidence in 1957. When individual cities do not report in time to be included in the Division total, an estimated total is calculated from the ratio of the entire population to the reporting population. Since such changes affect only a small proportion of a weekly total, the 1950 census populations are used for this purpose; use of a more accurate population figure is not considered necessary.

The "Epidemic Threshold"

As a device to provide some guidance in early recognition of increased incidence a broken line has been added to each figure. Its construction was based on the consideration that sporadic occurrence of high or low incidence in single weeks is not uncommon while elevated incidence for two successive weeks is more likely to occur in epidemic situations. Defining elevated incidence for two successive weeks as a "run of two," the "epidemic threshold" was determined so that with normal incidence a "run of two" would be uncommon, but with elevated incidence, more likely. Specifically, it was set at a level such that with normal incidence no "runs of two" would occur (on the average) in four out of five years experience. On the other hand, given an elevation of normal incidence by two standard deviations the odds are even that incidence during the two following weeks will exceed the threshold value. These are approximate probabilities, depending on the assumptions that successive deviations from "normal incidence" are independent and normally distributed.

The assumption of independence seems warranted during periods when incidence is at normal levels. As for normality it is well-known that mortality distributions tend to be positively skewed. This effect will tend to cause deviations to exceed the "epidemic threshold" somewhat more frequently than indicated by theory.

Acknowledgment

Preparation of the charts was greatly facilitated by the courtesy of Dr. Selwyn Collins in providing unpublished studies and data which were extremely useful in preliminary studies. Unpublished data of a similar nature on all causes of death were provided by Dr. Iwao Moriyama. These also were most valuable. Current weekly mortality data on influenza and pneumonia deaths are provided by the National Office of Vital Statistics.

Reference

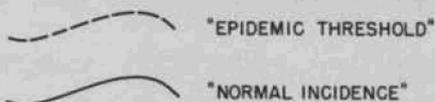
Collins, Selwyn D. and Lehmann, Josephine. 1953. Excess Deaths from Influenza and Pneumonia and from Important Chronic Diseases During Epidemic Periods, 1918-1951. Public Health Monograph, No. 10. Issued by Public Health Reports, U. S. Public Health Service, Washington 25, D. C.

Table 1

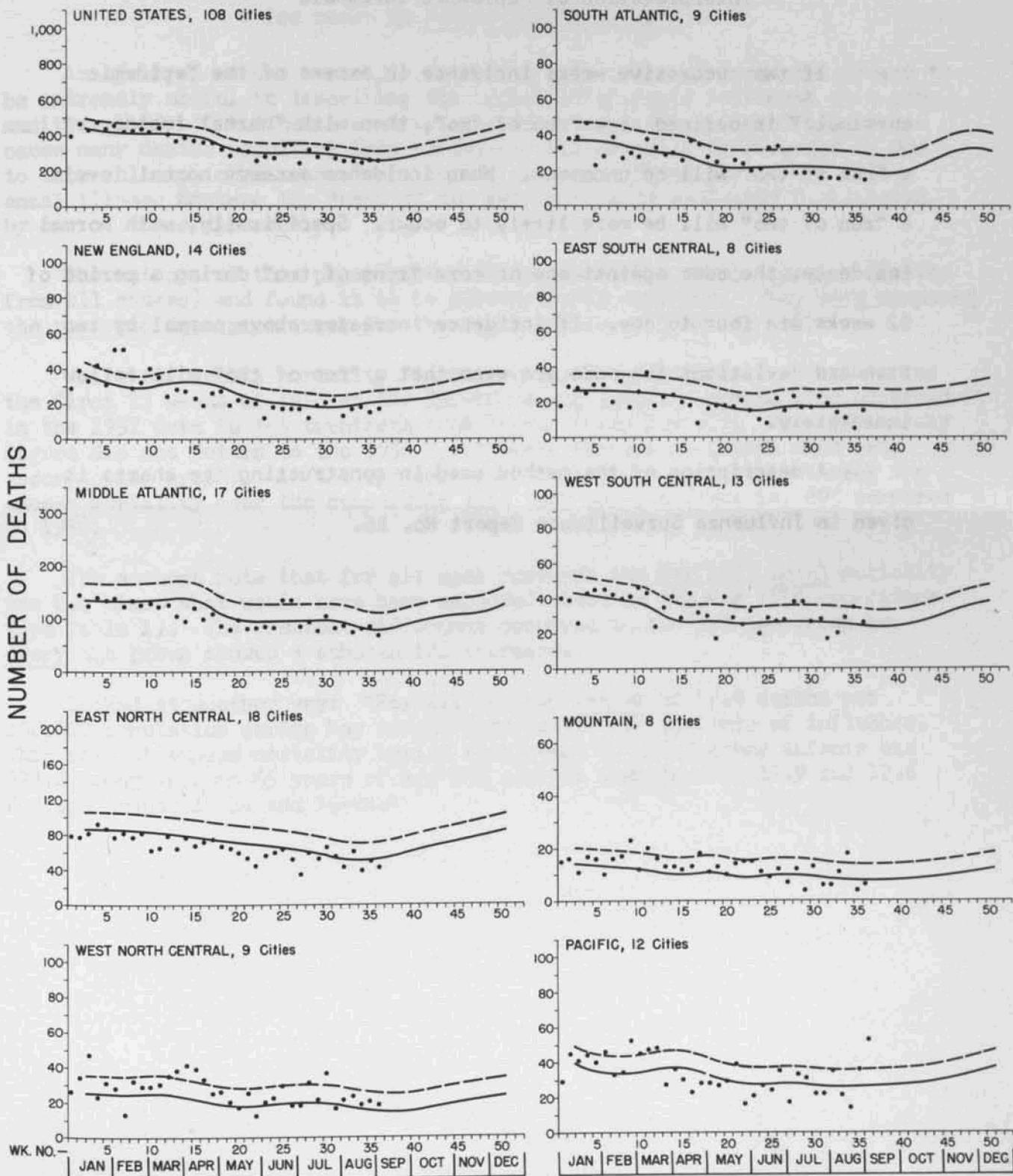
Current Influenza and Pneumonia Deaths
in 108 United States Cities

Division	Number of Deaths during Week Ending:		
	August 24	August 31	September 7
All Divisions	245	264	259
New England	18	15	17
Middle Atlantic	80	83	67
East North Central	38	49	42
West North Central	18	20	18
South Atlantic	19	17	15
East South Central	11	5	15
West South Central	29	35	26
Mountain	18	4	6
Pacific	14	36	53

WEEKLY PNEUMONIA AND INFLUENZA DEATHS



(SEE EXPLANATION ON BACK OF SHEET)



Interpretation of "Epidemic Threshold"

If two successive weeks incidence in excess of the "epidemic threshold" is defined as a "run of two", then with "normal incidence" a "run of two" will be uncommon. When incidence exceeds normal levels a "run of two" will be more likely to occur. Specifically, with normal incidence, the odds against one or more "runs of two" during a period of 52 weeks are four to one. If incidence increases above normal by two standard deviations the odds are even that a "run of two" will follow immediately.

A description of the method used in constructing the charts is given in Influenza Surveillance Report No. 16.

Appendix B: CDC Influenza Report No. 16

Abstract of portions of a paper: "Philippine Influenza Epidemic of 1957" by Dr. Matthew Tayback, Visiting Professor of Biostatistics at the University of the Philippines, and Dr. Arturo Reyes, Professor of Epidemiology, Institute of Hygiene, University of the Philippines.

(Note: This paper is to be published within a few weeks in Public Health Reports.)

Analysis of excess mortality data from all causes of death has proved to be extremely useful in describing the impact of epidemic influenza on a community. Study of influenza-associated deaths alone may be insufficient because many deaths resulting from influenza will actually be recorded as due to tuberculosis, cardiovascular disease, cancer, and the like. The influenzal illness hastens the death of the person already seriously debilitated by one of these diseases.

The authors of this paper have studied the Manila death registry (deaths from all causes) and found it to be substantially complete. They have compared the reported deaths per week for the first halves of 1956 and 1957.

While the weekly mortality figures remained essentially constant during the first 27 weeks of 1956 at the 150-200 death level, a marked rise occurred in the 1957 data in the twentieth week (that ending May 18). The 1957 weekly figure did not return to the 1956 level until the twenty-fourth week (see accompanying graph). At the epidemic peak during the twenty-first week the excess mortality over the comparable 1956 week was 498 (that is, 693 compared to 195).

The authors note that for all ages combined the May 1957 total mortality was 2.4 times what would have been expected based on the May 1956 experience (See Table I). The greatest difference occurred in the 5-9 age group but every age group showed a substantial increase.

Looked at another way: "For all ages an excess of 83.8 deaths per 100,000 population during May can be ascribed to the epidemic of influenza. This rate of excess mortality varies from peaks of 477.7 among infants and 373.8 among persons 65 years of age and over to a minimum of 12.9 and 12.6 for age groups 10-14 and 15-24."

TABLE I

Recorded Mortality from all Causes, City of Manila
 May 1956 and May 1957

Age Group	May 1956	May 1957	Ratio 1957:1956
all ages	761	1850	2.4
0-1	277	519	1.9
1-4	122	444	3.6
5-9	20	154	7.7
10-14	11	30	2.7
15-24	33	68	2.1
25-44	84	184	2.2
45-64	97	193	2.0
65 and over	117	258	2.2

Deaths from all Causes, Manila
 1956 and 1957

