Figure 8. MONTHLY PNEUMONIA – INFLUENZA MORTALITY AND RESPIRATORY DISEASE MORBIDITY – 1956-1959

Influenza and pneumonia trends are detected by analysis of information from a variety of sources. The three trend lines based on data from four sources reflect the same trend and, except for minor fluctuations, are remarkably similar.

The first graph shows the total number of deaths due to influenza and pneumonia recorded by the National Office of Vital Statistics in 1956-1957; and the number estimated monthly (1956-September 1958) from the 10 percent sample of death certificates maintained by the NOVS. (There is an eighteen-month lag in the availability of final figures on mortality in the United States; and a three- to four-month lag for data from the 10 percent sample.)

The second graph is a trend line constructed from the number of influenza and pneumonia deaths reported weekly by 108 cities in the United States. (These data are immediately available during the winter months by telegraph to the NOVS.)

The third graph is based on the number of new cases of respiratory illness, (involving one or more days of disability or a visit to a physician) collected through the National Health Survey. During the epidemic of 1957-1958, these data were available on a weekly basis. They are cumulated here on a monthly basis.

These trend lines show the salient characteristics of the epidemic, namely: 1) maximum number of respiratory illnesses in October; 2) maximum number of deaths recorded a month later; 3) a "second wave" of increased mortality during January, February, and March with little, if any, evidence of abnormal incidence of respiratory illnesses.

Figure 8. MONTHLY PNEUMONIA - INFLUENZA MORTALITY AND RESPIRATORY DISEASE MORBIDITY - 1956-1959

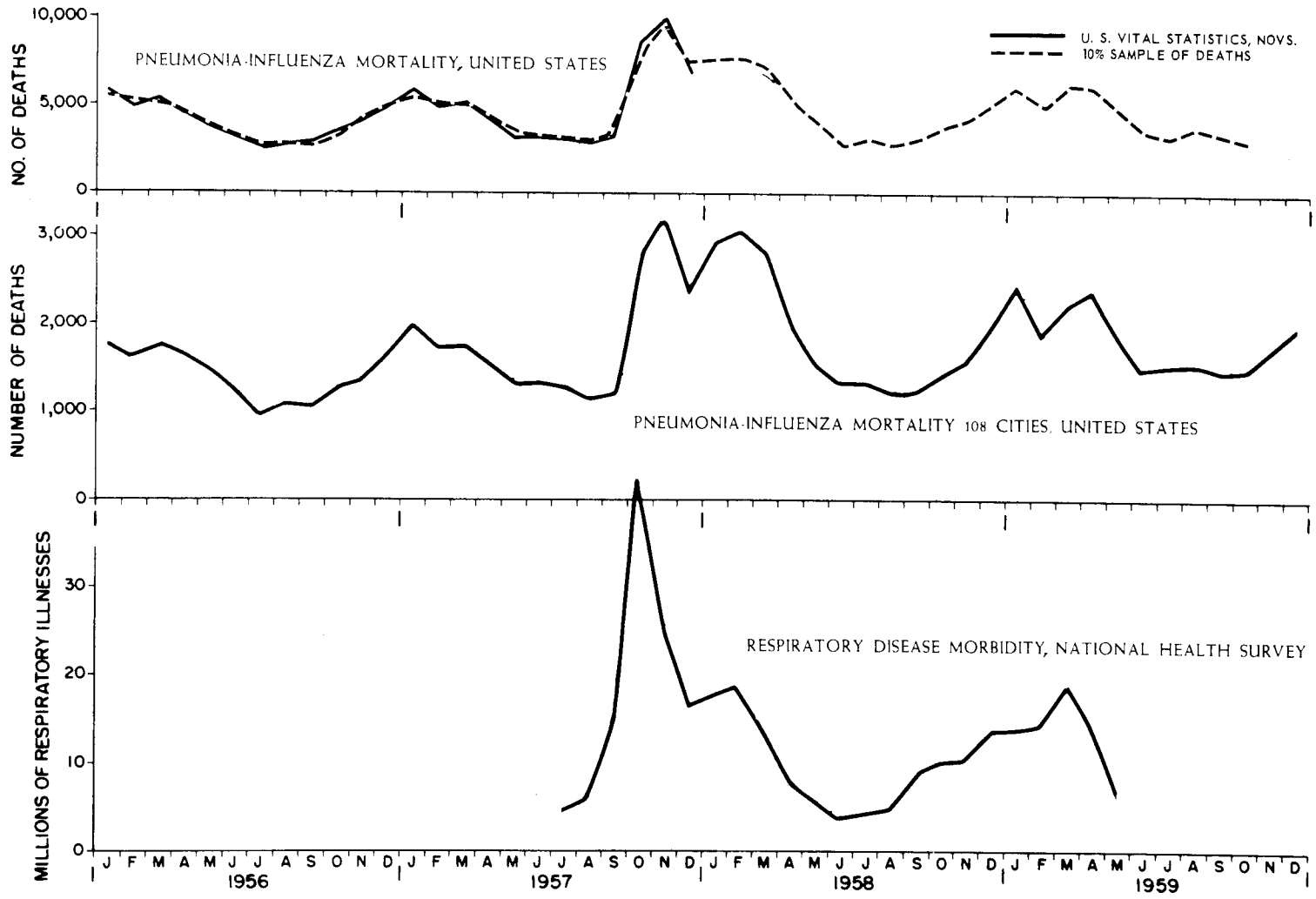

Figure 9. MORBIDITY AND MORTALITY PEAKS, ASIAN INFLUENZA, UNITED STATES – 1957

This graph illustrates the temporal relationships of morbidity and mortality from Asian influenza in the United States, as compiled from four sources.

1. **County Reporting:** This measurement consists primarily of data received from State Health Officers and Epidemiologists. It was supplemented in many instances by information received from Epidemic Intelligence Service Officers, the National Office of Vital Statistics, and newspaper accounts of the first recognition of sharp outbreaks in specific counties.

2. **National Health Survey:** In its first year of operation, the National Health Survey was able to organize a regular collecting system, on a nationwide sample basis, of the number of new cases of respiratory disease with one or more days in bed.

3. **Industrial Absenteeism:** Through the kind cooperation of Dr. L. Holland Whitney, Medical Director of the American Telephone and Telegraph Company, industrial absenteeism data on approximately 60,000 telephone employees in 36 major cities across the nation were made available from early October through the remainder of the epidemic.

4. **Excess Influenza and Pneumonia Mortality:** Influenza and pneumonia mortality data from the routine weekly telegraphic reports of 108 United States cities, with a total population of 50,000,000, were made available from the National Office of Vital Statistics. These data were then analyzed by the Communicable Disease Center's Statistics Section, using a modification of the procedure devised by Dr. Selwyn D. Collins.

To facilitate comparison of temporal relationships, each index is presented in terms of the total frequency during the 8-week period included in the chart.

It will be noted that there is remarkable agreement among the 3 morbidity indices, and that they rise and fall essentially in parallel. There is a 2- to 3-week lag in mortality. This is a reflection, in part, of inherent delay in reporting, the duration of the disease in the patient, and the later time of infection in the older and debilitated individual.

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Trotter, Y., Jr., Dunn, F. L., Drachman, R. H., Henderson, D. A., Pizzi, M., and Langmuir, A. D.: *Asian Influenza in the United States, 1957-1958,* Am. J. Hyg., 70:34-50, 1959.

Figure 9. MORBIDITY AND MORTALITY PEAKS, ASIAN INFLUENZA, UNITED STATES - 1957

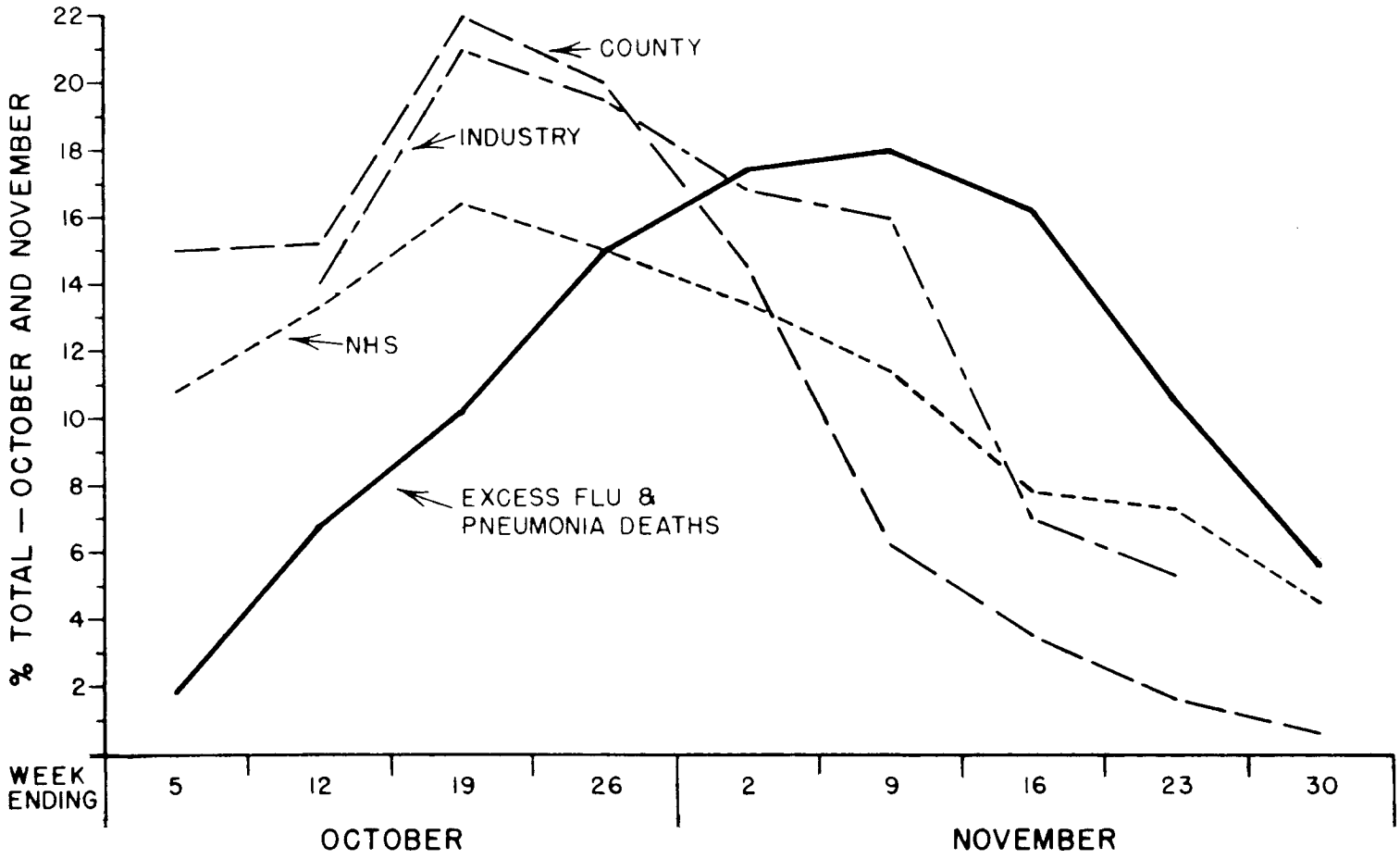

Figure 10. INFLUENZA AND PNEUMONIA DEATHS BY BROAD AGE GROUPS, UNITED STATES – 1956-57

In the pre-epidemic year of 1956, the seasonal distribution of deaths by broad age groups had a similar pattern for all ages: high in the winter months, decreasing to a low in June and July, slowly rising in August, and gathering momentum in October for the peak months of December and January. In 1957 this pattern was greatly changed by the Asian influenza epidemic.

In the age groups under 45, pneumonia – influenza deaths reached a peak in October except for infants under one year of age. In the infants, deaths increased steadily through December.

Among persons 45 years of age and older the number of pneumonia – influenza deaths reached a peak in November and decreased in December.

Source of Data: Special tabulations prepared by the National Office of Vital Statistics on number of pneumonia-influenza deaths, excluding pneumonia of the newborn.

Figure 10. INFLUENZA AND PNEUMONIA DEATHS
BY BROAD AGE GROUPS
UNITED STATES, 1956-1957

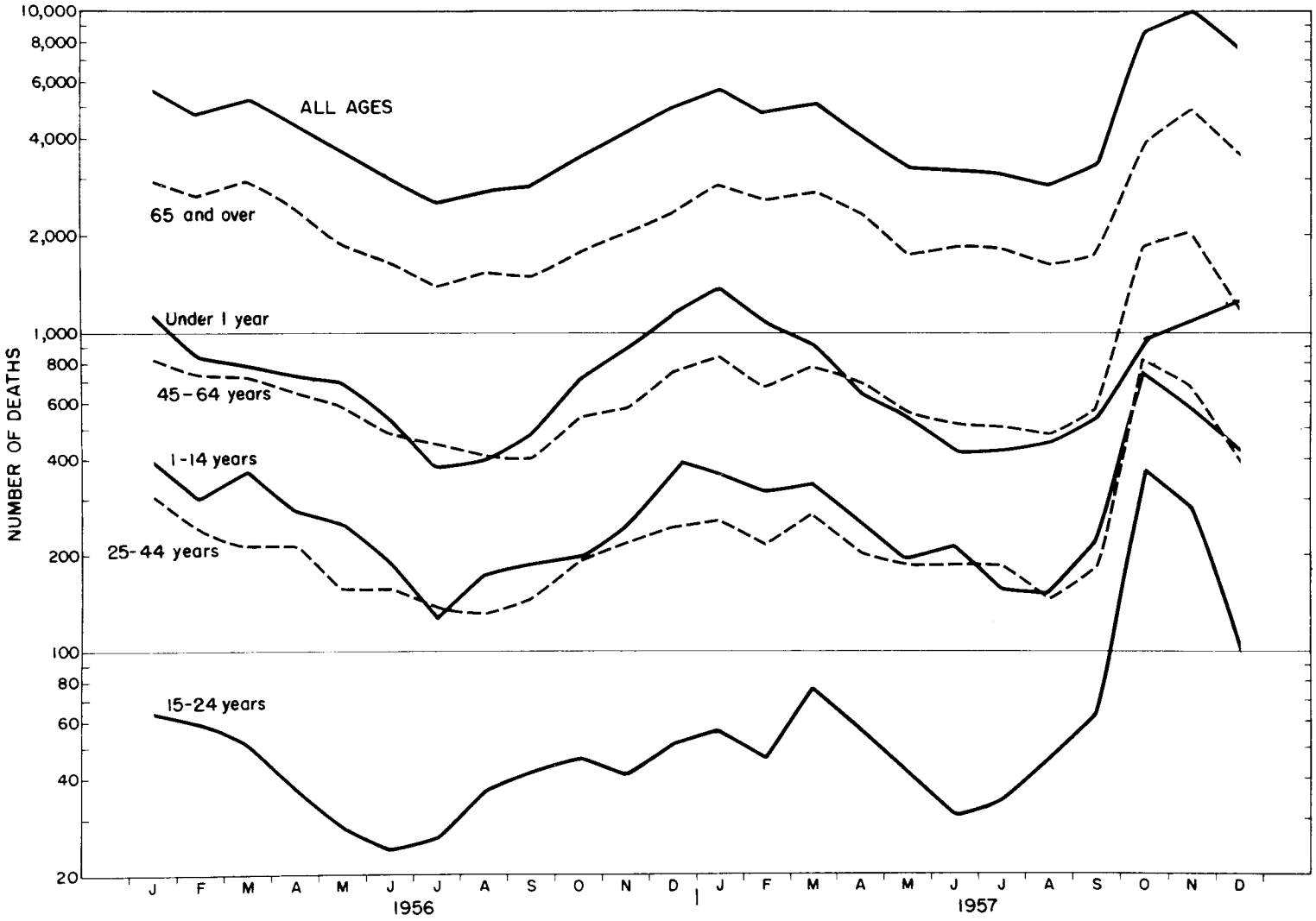

Figure 11. INFLUENZA AND PNEUMONIA DEATHS BY AGE GROUPS UNDER 25, UNITED STATES – 1956-57

Pneumonia – influenza deaths among the younger age population in 1956 followed the usual pattern of a rise in the fall, culminating in a maximum in the winter months of December and January.

In 1957 the pattern for all the younger age groups was essentially the same as in earlier years prior to the Asian influenza outbreak in the fall. Then, marked differences appear in the force of mortality by age.

Among infants the 1957 pattern was the same as in 1956 – rising to a maximum in December. The pre-school age group (1-4), in contrast to the 1956 pattern, reached maximum levels in October-November and decreased somewhat in December.

The school age and young adult groups showed sharp increases, with a peak in October, decreasing somewhat in November, and falling off sharply in December.

Source of Data: Special tabulations prepared by the National Office of Vital Statistics on number of pneumonia-influenza deaths, excluding pneumonia of the newborn.

Figure 11. INFLUENZA AND PNEUMONIA DEATHS BY AGE GROUPS UNDER 25
UNITED STATES - 1956-57

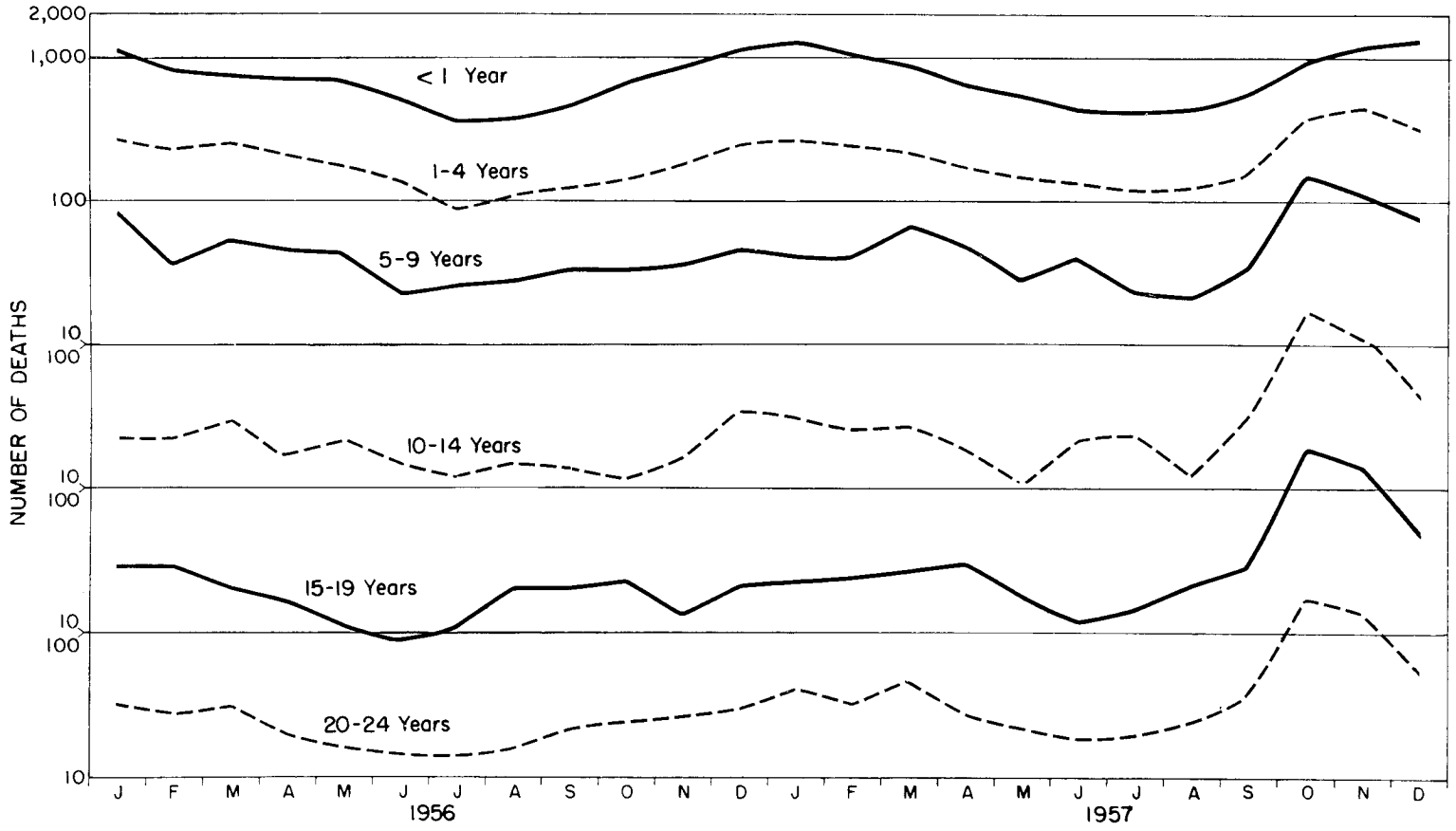

Figure 12. PNEUMONIA AND INFLUENZA MORTALITY BY AGE IN CERTAIN EPIDEMIC YEARS, ANNUAL RATES BY AGE

This figure shows pneumonia - influenza mortality rates by age in certain U. S. epidemics of the last 70 years.

Note the extremely high mortality rates, the "W" shape of the age-specific rate curve in 1918, and the absence of similar features in the other epidemic years. The marked decline in pneumonia - influenza mortality is apparent.

Rates for 1892, 1918, and 1936 were taken from a paper of Selwyn D. Collins published in Public Health Reports, July 20 and July 27, 1945, pp. 821-835 and 853-863. Rates for 1957 were taken from the Special Report Series, National Summaries, Vol. 50, No. 5, April 24, 1959, of the National Office of Vital Statistics.

Figure 13. INFLUENZA AND PNEUMONIA MORTALITY RATES IN THE UNITED STATES BY AGE – OCTOBER-MARCH 1956-57 AND 1957-58.

This figure demonstrates that the curve of mortality rates due to influenza and pneumonia by age which was recorded during the 1957-58 epidemic is in the shape of a letter "U", with high mortality rates at either end of the age spectrum. This "U"-shaped curve of mortality rates by age has characterized influenza epidemics since 1920, and was not altered as a result of the introduction of the Asian strain of influenza. There was an increase in mortality rates due to influenza and pneumonia in all age groups in 1957-58 as compared to 1956-57, but no deviation from the usual age curve can be found.

Before the epidemic of Asian influenza began in the fall of 1957, fears were expressed that the introduction of the new strain might result in a relatively high mortality in young adults such as characterized the 1918-19 pandemic (Figure 12). The "W"-shaped age-specific mortality rate curve recorded in 1918-19 has, however, remained a unique and unexplained occurrence.

Figure 13. INFLUENZA AND PNEUMONIA MORTALITY RATES IN THE UNITED STATES BY AGE - OCTOBER - MARCH, 1956-57 AND 1957-58

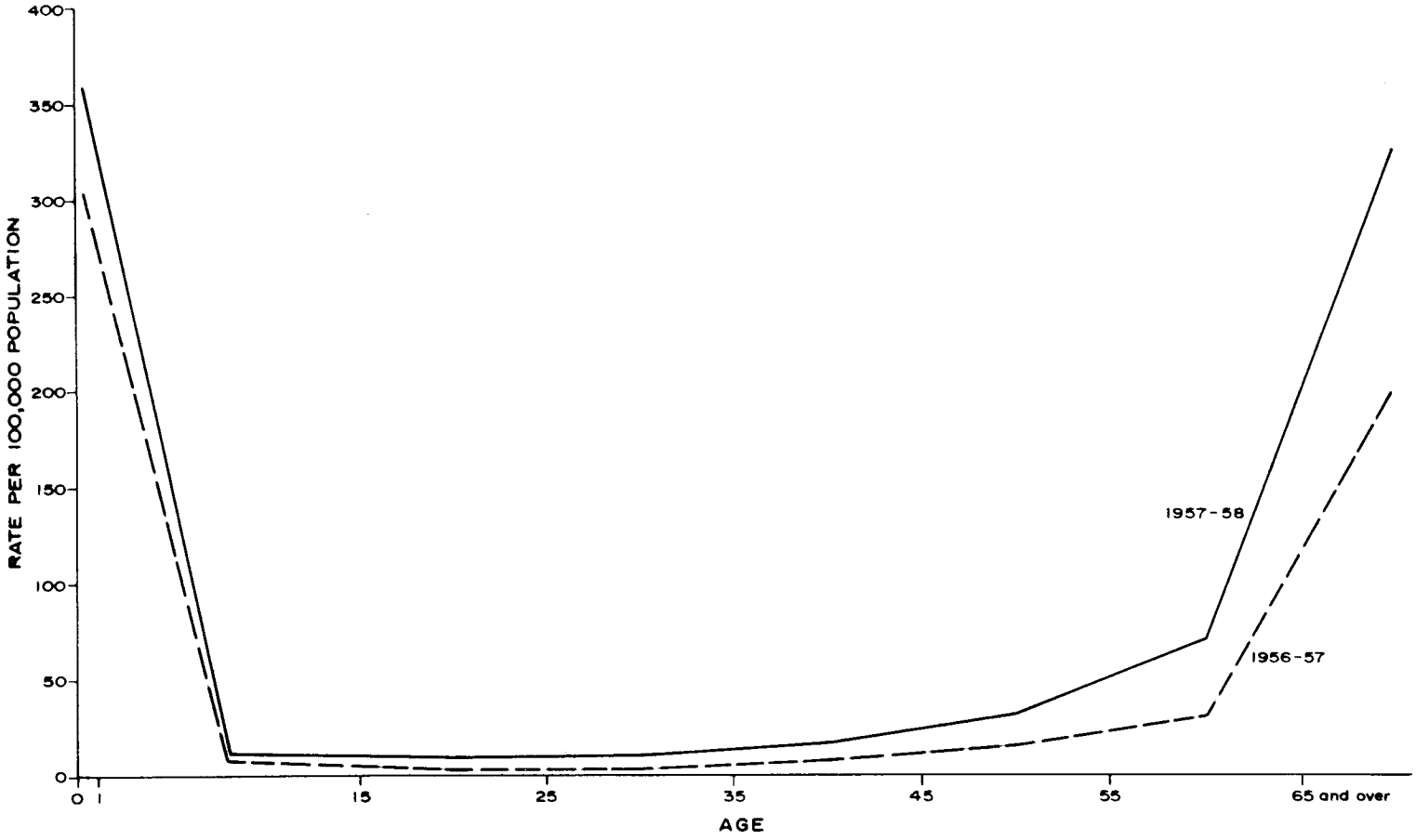

Figure 14. MORTALITY FROM INFLUENZA AND PNEUMONIA FOR SELECTED YEARS IN THE UNITED STATES

As shown in Figure 14, the pneumonia and influenza death rates in the 1957-58 epidemic in the United States were not excessively high when compared with the same rates for certain other recent epidemics. The peak of mortality in the 1953 epidemic was reached in February with a death rate from influenza and pneumonia of 75.9 per 100,000 population. In the 1951 epidemic, the mortality peak occurred in March with a rate of 59.8 per 100,000 population. The mortality experience in the 1957-58 epidemics was slightly different, consisting of two broader and longer peak periods which extended over a period of approximately six months. The highest point in the 1957-58 epidemic occurred in November when the influenza-pneumonia mortality rate was 66.6 per 100,000 population. It should be recognized, however, that the normal seasonal levels of influenza-pneumonia mortality rates are significantly lower in the autumn months (October – December) than in the winter months (January – March).

REFERENCE

Dauer, C. C.: *Mortality in the 1957-58 Influenza Epidemic*, Pub. Health Rep., 73:803-810, 1958.

Figure 14. MORTALITY FROM INFLUENZA AND PNEUMONIA FOR SELECTED YEARS IN THE UNITED STATES

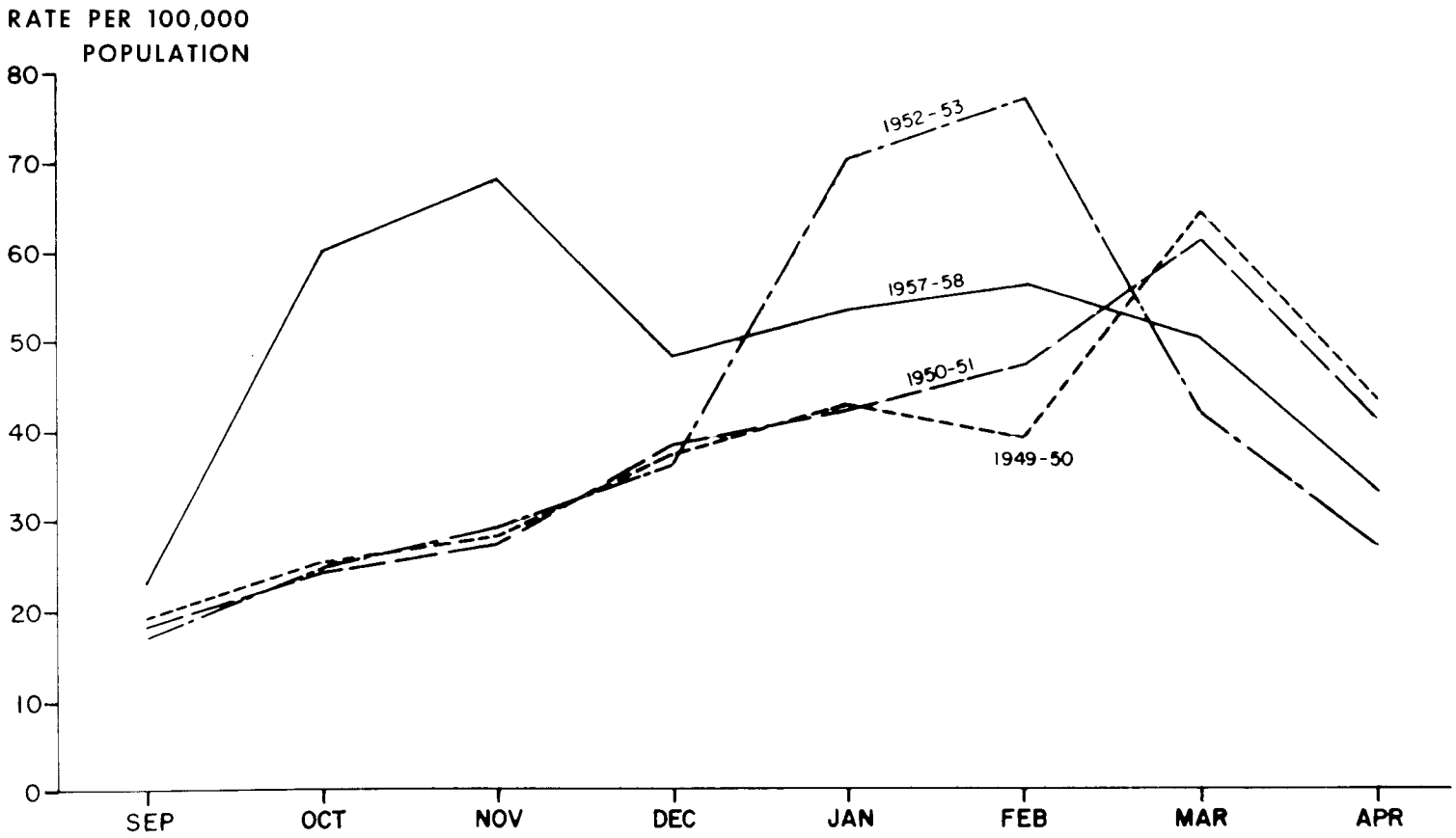

Figure 15. WEEKLY INFLUENZA AND PNEUMONIA DEATHS IN ENGLAND AND THE UNITED STATES – 1957-58

This figure illustrates the similarity between the English and American experiences in the epidemic of Asian influenza in 1957-58. The English data represent the experience in 160 Great Towns which contain the bulk of the urban population of England and Wales. The mortality data from the United States similarly reflect an urban population, the residents of 108 major cities, comprising approximately 34 percent of the population of this country. It will be noted that the Asian influenza epidemics as measured by mortality due to influenza and pneumonia peaked in England about four weeks before those in the United States. The marked parallelism in the shape of the curves, including the unique second wave in the early months of 1958, is evident.

Figure 15. WEEKLY INFLUENZA AND PNEUMONIA DEATHS IN ENGLAND AND THE UNITED STATES – 1957-58

This figure illustrates the similarity between the English and American experiences in the epidemic of Asian influenza in 1957-58. The English data represent the experience in 160 Great Towns which contain the bulk of the urban population of England and Wales. The mortality data from the United States similarly reflect an urban population, the residents of 108 major cities, comprising approximately 34 percent of the population of this country. It will be noted that the Asian influenza epidemics as measured by mortality due to influenza and pneumonia peaked in England about four weeks before those in the United States. The marked parallelism in the shape of the curves, including the unique second wave in the early months of 1958, is evident.

Figure 15. WEEKLY INFLUENZA AND PNEUMONIA DEATHS IN ENGLAND AND THE UNITED STATES - 1957-58