

Philippine Influenza Epidemic of 1957

MATTHEW TAYBACK, Sc.D., and ARTURO C. REYES, M.D., Dr.P.H.

This paper presents such data as it has been possible to assemble on the commencement of the influenza epidemic in the city of Manila, the time sequence of the outbreak, the nature of the resulting mortality, and an estimation of the attack rates. The information should assist in an appreciation of the epidemiology of Asian influenza, which during the first half of 1957 was reported in epidemic proportions in Hong Kong, Singapore, Taiwan, the Philippines, Japan, Australia, and India.

AN UNUSUAL increase in the incidence of reported cases of influenza in the city of Manila, Philippines, was apparent as early in 1957 as the week ending May 11, the 19th week (see chart). Evidence that influenza was present in epidemic proportions in the western Pacific area immediately prior to this time is available from intelligence reports gathered by the Singapore Epidemiological Intelligence Station. The information is in the files of the Western Pacific office of the World Health Organization. The earliest indication of epidemic influenza appears in the following abstract from a story in the *South China Morning Post*, Hong Kong, April 17, 1957:

EPIDEMIC IN CHINA—Arrivals in Hong Kong yesterday from Central China said that influenza has reached epidemic proportions in Shanghai, Nanking, Kuhan, as well as Peking. Doctors, they added, were working overtime in hospitals and clinics treating patients. They said that as far as they know, no deaths from influenza have been reported. Chinese newspapers said that influenza was also spreading in other parts of China and as far north as Inner Mongolia, as well as southwards in Kwangsi and Kwangtung. Many cases, it was added, had already been reported in Canton.

The following statements in a subsequent report by the Singapore intelligence officer

dated May 20, 1957, appear pertinent to the introduction of influenza into the Philippines through Manila.

HONG KONG—Commencement . . . In 2d week of April 1957 rising to epidemic incidence in the 3d and 4th weeks of that month. Number of cases has been falling rapidly since then.

Total numbers affected are not obtainable with any degree of accuracy as the disease has not been notifiable; but as an estimate, not less than 10 percent of the population were affected. Absence of sick staff caused slight curtailment of transport services and some restriction of output from factories. Schools officially remained open.

Fatality rate was negligible.

TAIWAN—At the end of April 1957, many cases with symptoms of influenza appeared in the public hospitals and private clinics in Keelung City. In Taipeh City, cases with symptoms of influenza appeared at the beginning of May.

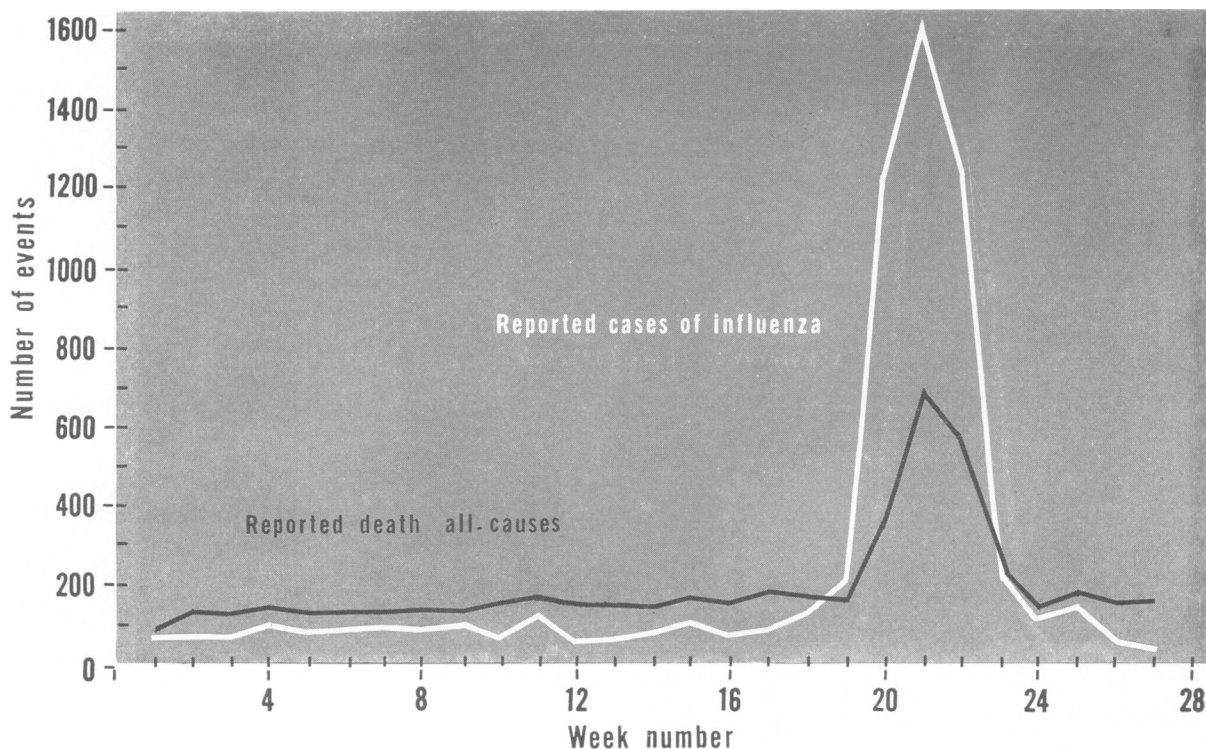
No fatal cases have been proved.

SINGAPORE—As of May 9, the influenza epidemic has affected about 10 percent of the population.

It is reasonable to suppose that the onset of epidemic influenza in Manila was associated with the presence of this entity in Hong Kong and Taiwan, both of which are in frequent, if not daily, contact through commercial and passenger traffic with Manila. The existence of epidemic influenza in South China was a pos-

Dr. Tayback, assistant commissioner of health, Baltimore City Health Department, Maryland, is on assignment in the Philippines with the World Health Organization. He is visiting professor of biostatistics at the Institute of Hygiene, University of the Philippines. Dr. Reyes is professor of epidemiology at the Institute of Hygiene.

Cases of influenza and deaths from all causes, by week of report, Manila, 1957



sible prelude to its introduction into Hong Kong.

Influenza is endemic in Manila. The weekly reported incidence ranged from 59 to 209 cases during the first half of 1956 and from 55 to 149 cases for the first 18 weeks of 1957 (table 1). In the week ending May 11, 212 cases were reported, a substantial rise from the weekly totals recorded prior to that time. By itself, this rise would have little significance, but in the following week the reported incidence was 1,215. It may be surmised, therefore, that epidemic influenza took hold during the week of May 11. Examination of the chart indicates that the influenza incidence returned to the endemic level during the week ending June 15, the 24th week. Epidemic influenza was present for a period of 5 weeks, with the preponderance of reported cases occurring within a period of 3 weeks.

Extent of Population Affected

The intelligence reports received and issued by the Singapore Epidemiological Intelligence Station were notably deficient in valid esti-

mates of the incidence of influenza during the epidemic intervals. The medical officer of Hong Kong reported that not less than 10 percent of the population was affected. The health authority of Singapore also reported an incidence in the area of about 10 percent. The city health officer of Manila based an estimate of incidence upon the experience of city employees and reached an impression of 20 percent.

Using a form for ascertaining household incidence of influenza during the second quarter of the year, originally proposed by Dr. Jacinto Dizon, chief of the section of epidemiology and vital statistics, Bureau of Health of the Philippines, we obtained an attack rate of 44 percent for members of the 49 households with which students at the Institute of Hygiene, University of the Philippines, were associated (table 2). Study of the factor of residence, rural versus urban, yielded no difference of note. Age variation in attack rates was evident, smaller frequencies being noted at older ages, but the small size and the extraordinary selectiveness of the sample indicated caution in analysis. The magnitude of the attack rate for all ages combined was surprising in view of previous estimates of

Table 1. Reported number of deaths (all causes) and of influenza cases, Manila, 1957 and 1956

Week No.	1957		1956	
	Deaths from all causes	Cases of influenza	Deaths from all causes	Cases of influenza
1.....	88	80	149	59
2.....	143	77	111	84
3.....	136	73	144	99
4.....	146	101	133	68
5.....	133	89	130	96
6.....	134	87	128	79
7.....	137	97	184	68
8.....	137	95	139	75
9.....	139	103	120	121
10.....	157	79	148	100
11.....	171	126	164	87
12.....	152	55	154	131
13.....	152	60	138	104
14.....	150	77	159	100
15.....	169	117	151	126
16.....	156	81	188	181
17.....	187	149	200	209
18.....	167	128	147	109
19.....	167	212	163	105
20.....	364	1, 215	185	124
21.....	693	1, 621	195	110
22.....	569	1, 244	154	133
23.....	267	270	163	132
24.....	139	122	202	125
25.....	166	161	190	146
26.....	150	56	205	182
27.....	162	50	185	114

10 to 20 percent and in view of the high economic standing of the sample.

It was decided, therefore, to select a representative sample of the population in Manila and by household interview to obtain unbiased estimates of influenza attack rates. The existence of an ongoing sample survey program, the Philippine statistical survey of households, provided a frame from which we could choose a stratified systematic sample of households. Of the 159 households selected, 141 (88 percent) were successfully interviewed. Seventeen households could not be located, but substitutions were made for all except one by taking the unit closest to the scheduled household. The following data are based, therefore, on 158 household interviews.

The total number of individuals in the units interviewed was 1,144, an average of 7.2 per household. This is about the same size family as found in the student household survey (8.3) but, of course, much larger than the average in

the United States and in most Western European countries. The distribution of the sample by age and the attack rates for influenza are shown in table 3. For all age groups, 70 percent of the individuals for whom a history was obtained were attacked by influenza. The attack rates do not vary significantly within the age range 1-14 years. However, there is evidence of decline in attack rates with age for individuals 15 years and older, although the attack rate for persons 45 years of age and over still exceeds 50 percent.

No noteworthy sex differences in attack rates were observed. The age trends noted above

Table 2. Influenza experience of 49 households, reported by students of the Institute of Hygiene, University of the Philippines, April-June 1957

Age of household members (years)	Number persons at risk	Number attacked	Percent attacked
Total			
All ages.....	411	180	44
Under 1.....	15	6	40
1-4.....	34	20	59
5-9.....	40	21	53
10-14.....	55	26	47
15-24.....	101	44	44
25-44.....	114	44	39
45 and over.....	52	19	37
Metropolitan Manila			
All ages.....	112	47	42
Under 1.....	3	0	55
1-4.....	8	6	
5-9.....	9	5	41
10-14.....	8	2	
15-24.....	28	15	54
25-44.....	41	14	34
45 and over.....	15	5	33
Rest of Philippines			
All ages.....	299	133	44
Under 1.....	12	6	50
1-4.....	26	14	54
5-9.....	31	16	52
10-14.....	47	24	51
15-24.....	73	29	40
25-44.....	73	30	41
45 and over.....	37	14	38

Table 3. Influenza experience reported by a sample of 158 households in Manila, April-June 1957

Age of household members (years)	Number persons at risk	Number attacked	Percent attacked
All ages.....	1, 144	796	70
Under 1.....	32	19	59
1-4.....	133	104	78
5-9.....	154	116	75
10-14.....	130	102	78
15-24.....	279	204	73
25-44.....	289	184	64
45 and over.....	127	67	53

prevailed among both sexes. A question of some importance is whether the proportion of the population affected was influenced by its density. We have found it possible to classify the sample households according to the average density reported for the area in which they were located. Three categories were formed: 50 or more inhabitants per square kilometer, 30-49 inhabitants, and less than 30. No significant difference in attack rates was found.

It is clear that the high attack rates reported for the small group of student households did not exaggerate the extent to which epidemic influenza affected the population of Manila, nor did it improperly indicate the general age trend in the attack experience.

Excess Mortality From All Causes

The severity of an influenza epidemic can be measured by the percentage of individuals who

require medical attention, the number of days lost from work, and probably by other indexes. However, there can be little question that the statistics relating to mortality provide a rational means of assessing the severity of the clinical entity which we call Asian influenza.

In Manila, all deaths occurring within the city are registered with the city health department. Deaths among nonresidents are not included in the monthly detailed mortality statistics. It is generally agreed by vital statisticians who have studied the registration system in Manila that registration of deaths is substantially complete. The effect of acute epidemic respiratory disease in terms of death is best measured by a consideration of the excess mortality from all causes which occurs simultaneously with the epidemic rather than in terms of deaths ascribed only to influenza or bronchopneumonia. The reason is that the extent of mortality from tuberculosis and cardiovascular disease can be markedly affected by the presence of influenza.

In table 4 the number of resident deaths for Manila is given by age group and by month for the first half of 1956 and of 1957. The number of deaths from all causes for all ages was very similar in 1956 and 1957 except in May, the peak month of reported influenza cases. In table 5, the number of deaths for each age group is shown for the first 4 months of 1957 and of 1956. The correspondence of the figures for the 2 years is remarkable. It is reasonable to expect that, in the absence of unusual circumstances, the number of deaths from all causes and their distribution by age would

Table 4. Number of deaths, by age and month of occurrence, Manila, 1957 and 1956

Age (years)	January		February		March		April		May		June	
	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956
All ages.....	616	600	544	606	685	636	715	737	1, 850	761	782	808
0-1.....	234	200	201	221	253	241	274	277	519	277	241	301
1-4.....	66	77	92	81	100	82	123	116	444	122	144	153
5-9.....	12	14	11	25	25	23	25	29	154	20	13	23
10-14.....	5	13	6	6	3	7	11	8	30	11	10	5
15-24.....	28	28	34	24	22	20	19	31	68	33	46	32
25-44.....	71	78	50	73	73	68	73	73	184	84	105	78
45-64.....	96	93	63	76	97	107	83	89	193	97	113	102
65 and over.....	104	97	87	100	112	88	107	114	258	117	110	114

Table 5. Recorded mortality from all causes, Manila, January–May, 1957 and 1956

Age (years)	January–April		May		1957 1956	Percent of popula- tion ¹	Excess mortality	Excess mortality percent of population	Excess mor- tality per 100,000 estimated population ²
	1957	1956	1957	1956					
All ages.....	2, 560	2, 579	1, 850	761	2. 4	100. 0	1, 089	10. 9	83. 8
0–1.....	962	939	519	277	1. 9	3. 9	242	62. 1	477. 3
1–4.....	381	356	444	122	3. 6	13. 0	322	24. 8	190. 5
5–9.....	73	91	154	20	7. 7	15. 0	134	8. 9	68. 7
10–14.....	25	34	30	11	2. 7	11. 3	19	1. 7	12. 9
15–24.....	103	103	68	33	2. 1	21. 3	35	1. 6	12. 6
25–44.....	267	292	184	84	2. 2	22. 7	100	4. 4	33. 9
45–64.....	339	365	193	97	2. 0	9. 9	96	9. 7	74. 6
65 and over.....	410	399	258	117	2. 2	2. 9	141	48. 6	374. 0

¹ The percentage distribution of population for Manila is assumed to be equivalent to that given for the urban area as reported by the Philippine Statistical Survey of Households, series No. 2, vol. 1, Demographic and Socio-Economic Data.

² Population estimates for Manila are extremely difficult to judge with respect to reliability. An estimate by the Bureau of Health for July 1, 1955, was 1,250,000. The annual natural increase is approximately 35,000. The population used here was 1,300,000.

have been about the same in May 1957 as in May 1956. The actual number of deaths during these two months, however, was very different. For all ages combined, the mortality from all causes in May 1957 was more than twice (2.4) what would have been expected from the 1956 experience. The ratio varies with age, the greatest difference occurring among children 5–9 years of age. It should be added that these ratios represent an approximation to the rate of increase in the age-specific mortality rates.

Another way of looking at the data would be to consider the manner in which the various age groups contributed to the excess mortality. Since the intervals covered by the several age groups vary in size and include an unequal proportion of the population, the excess mortality (May 1957 minus May 1956) was related to the percentage of the population to obtain the index "excess mortality percent of population" (table 5). This index was selected because recent information of reasonable precision was available with respect to the percentage distribution of the population by age. For those who prefer to express this index per 100,000 population, an attempt was made to obtain such indexes by age, and these also are shown in the table. These figures may be interpreted as follows. For all ages an excess of 83.8 deaths from all causes per 100,000 population occurred during the epidemic of influenza in May. This rate of excess mortality varies from peaks of

477.3 among infants and 374 among persons 65 years of age and over to minimums of 12.9 and 12.6 for age groups 10–14 and 15–24.

A question which may arise is whether the excess mortality found in Manila in association with epidemic influenza of the Asian strain of virus was unique and peculiar to this city. The reports from Hong Kong, Singapore, and Taiwan indicated that the disease was mild and that fatalities were rare.

We have taken advantage of some papers on file in the Western Pacific office of the World Health Organization to explore this issue a bit further. In table 6 the trend in deaths from all causes and from tuberculosis is shown for Hong Kong for the first 5 months of 1957. During

Table 6. Average weekly number of deaths from all causes and from tuberculosis, Hong Kong, 1957

Period	All causes	Tuberculosis
Dec. 30, 1956–Jan. 26, 1957.....	338	47
Jan. 27–Feb. 23.....	466	63
Feb. 24–Mar. 30.....	394	57
Mar. 31–Apr. 6.....	352	61
Apr. 7–13.....	370	45
Apr. 14–20.....	543	82
Apr. 21–27.....	681	112
Apr. 28–May 4.....	506	85
May 5–11.....	454	79
May 12–18.....	382	61
May 19–25.....	387	73
May 26–June 1.....	361	54

Table 7. Average weekly number of deaths from influenza and pneumonia, Singapore, 1957

Period	Influenza and pneumonia	Influenza	Pneumonia
Dec. 30, 1956-Jan. 26, 1957-----	14		14
Jan. 27-Feb. 23----	12		12
Feb. 24-Mar. 30----	14	1	13
Mar. 31-Apr. 27----	16		16
Apr. 28-May 4-----	17	1	16
May 5-11-----	45	8	37
May 12-18-----	73	12	61
May 19-25-----	98	24	74
May 26-June 1-----	39	8	31

the 3-week period April 14-May 4, the weekly totals of deaths from all causes and from tuberculosis were clearly in excess of the trend prior and subsequent to this period. Furthermore, this period exactly coincides with the reported time of the epidemic of influenza in Hong Kong. Similar data on deaths from influenza and bronchopneumonia could not be found.

For Singapore weekly reports of the city health office gave the number of deaths from influenza and pneumonia, but the number of deaths from all causes was not available. It will be seen from table 7 that excess mortality from influenza and pneumonia combined is unquestionable during the period May 5-June 1, which is consistent with the reported outbreak of epidemic influenza in Singapore.

Certainly a more detailed analysis of mortality data from Hong Kong and Singapore would be helpful, but the excess mortality described earlier in connection with the influenza epidemic in Manila cannot be considered an experience peculiar to this city, nor should broad reports of "no fatalities" be accepted without careful attention to total mortality.

Summary

During the week ending May 11, 1957, the reported cases of influenza in Manila, Philippines, gave evidence of the existence of an abnormal incidence of this disease. In the 4 weeks which followed, weekly reported totals were markedly in excess of the endemic levels customarily recorded.

Epidemiological intelligence of the Singapore office of the World Health Organization indicates that several weeks prior to the occurrence of epidemic influenza in Manila, outbreaks of influenza had occurred in China, Hong Kong, and Taiwan. It seems probable that epidemic influenza was introduced into Manila from Hong Kong or Taiwan, or both.

The percentage of the population attacked was determined by means of a household survey of a representative sample of households in Manila. For all ages combined, the attack rate was 70 percent. Maximum attack rates were noted in the age range 1-14 years, with evidence of a decline with increase in age for those 15 years of age and over. However, no age group experienced an attack rate of less than 50 percent. Sex differences were not found, nor was there evidence of variation of attack rates with population density.

Excess mortality was unquestionably attributable to the epidemic. One impression is that as an immediate consequence of the epidemic there was an excess of 84 deaths per 100,000 population, a ratio which varied from maximums of 477 for infants under 1 year of age and 374 for persons 65 years and over to a minimum of 13 for age groups 10-14 and 15-24.

The full impact of an influenza epidemic should be assessed in terms of mortality from all causes rather than in deaths specifically ascribed to influenza.