SECTION 17 SPECIAL REVIEW

MORBIDITY AND MORTALITY FROM TUBERCULOSIS IN HONG KONG - THE LAST 30 YEARS

This article describes the declining trend in TB morbidity and mortality in Hong Kong during the last 30 years.

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1. *BACKGROUND*

During the early 1920's when communicable diseases prevailed, Hong Kong, like many other countries, suffered from tuberculosis in its varying forms. The estimated TB mortality rate was about 320 deaths per 100,000 population. A decline in TB mortality was first observed in the early 1930's; however, with some 230 TB deaths per 100,000 population, the disease was still very prevalent. Following the influx of immigrants from China just before the Second World War, TB mortality once again rose to well over 300 per 100,000 population in 1938. In order to obtain information on the incidence of the disease, TB became notifiable in January 1939. The total number of notifications recorded in the year was 7,591 giving a notification rate of 434 per 100,000 population and a deaths to notifications ratio of 59%. The disease was however considered underreported.

With only some 600,000 population in the year immediately after the War, general health conditions were surprisingly good. TB mortality remained relatively low at about 110 per 100,000 population throughout the late 1940's. Against this background of low TB mortality, TB notifications increased significantly, almost three-fold over the 4-year period, from 2,801 in 1946 to 7,510 in 1949. The TB deaths to notifications ratio dropped from 63% to 35% over the same period, indicating that there were significant improvements in treatment as well as the completeness of the notification system during these years.

2. *THE DECLINING TRENDS OF MORBIDITY AND MORTALITY*

In 1950, a rapid increase in TB notifications was recorded following an influx of refugees in 1949. Compared with the previous year, the total number of notifications increased by 21% in 1950; the corresponding mortality rate also increased by 25%. It was against this background of rapidly expanding population with rising TB incidence and deaths that specific therapy was introduced. However, the number of notifications did not decline; on the contrary, it increased by as much as 51% in 1951. This latter figure, however, did not reflect the real change in TB morbidity over time. Compared to a rise of only 28% in TB mortality, it may be safely stated that a significant part of the increase in the notification rate was attributable to the availability of diagnostic and treatment facilities to the public following the opening of new TB clinics; an intensified search for the disease among contacts; introduction of mass X-ray surveys using mobile units and, of course, rapid growth in the population at large.

17.1 TB NOTIFICATIONS AND DEATHS SINCE 1920 (SELECTED YEARS ONLY)

Year	TB notifications	TB notification rate per 100,000 population	TB deaths	TB death rate per 100,000 population	Deaths to notifications ratio (%)	TB deaths as % of total deaths
1924	—	—	2,358	339.0	—	—
1929	—	—	2,158	268.7	—	—
1934	—	—	2,179	230.7	—	—
1939	7,591	433.7	4,443	253.8	58.5	—
1944			World War II			
1949	7,510	404.4	2,611	140.6	34.8	16.0
1952	14,821	697.2	3,573	168.1	24.1	18.4
1954	12,508	528.9	2,876	121.6	23.0	14.9
1959	14,302	482.0	2,178	73.4	15.2	10.7
1964	12,557	358.3	1,441	41.1	11.5	7.9
1969	11,072	286.6	1,470	38.0	13.3	7.8
1974	8,320	192.6	974	22.5	11.7	4.4
1979	7,907	161.4	523	10.7	6.6	2.0

CHART 1: TB NOTIFICATIONS AND DEATHS SINCE 1946

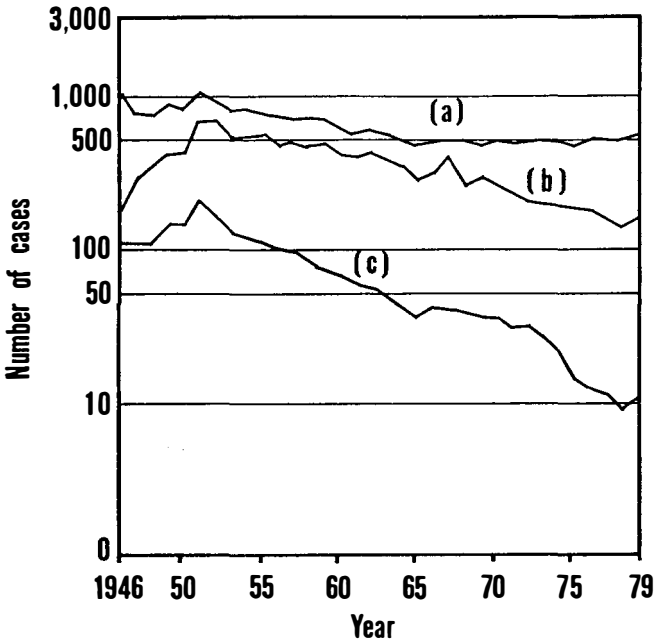
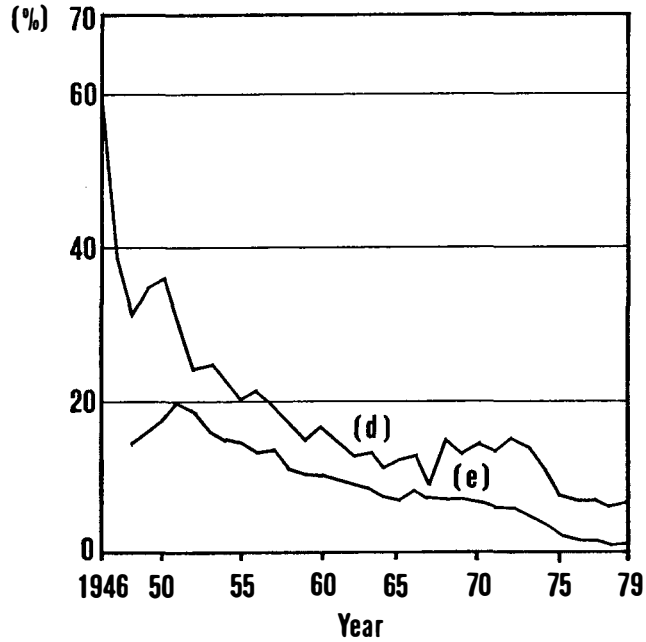


CHART 2: TB DEATHS AS PERCENTAGE OF TOTAL DEATHS/NOTIFICATIONS, SINCE 1946



Notes: (*a*) Crude death rate—total deaths (all causes) per 100,000 population.
(*b*) TB notification rate—TB notifications per 100,000 population.
(*c*) TB death rate—TB deaths per 100,000 population.
(*d*) Deaths to notifications ratio—TB deaths/TB notifications × 100%
(*e*) TB deaths to total deaths ratio—TB deaths/total deaths × 100%

TB mortality and morbidity reached their peak in the years 1951 and 1952 respectively. TB deaths accounted for one fifth of total deaths; 34% of TB deaths occurred in children under the age of 5, and 8% in infants under the age of 1. The infant mortality rate was then 92 per 1,000 live births, of which 4.7 (or 5%) was attributable to TB deaths.

As a long-term effort to reduce TB morbidity and mortality especially in infancy and early childhood, a BCG vaccination campaign was introduced in April 1952 with assistance from UNICEF and WHO. All children in school were tuberculin-tested and negative reactors were vaccinated. BCG vaccination was also offered on a house to house basis to all, irrespective of age but the particular target group was pre-school children. Vaccinations of newborn babies were conducted in maternity homes and hospitals, and young children were vaccinated in Infant Welfare Centres.

Since the introduction of BCG vaccination, the percentage of newborn children vaccinated increased steadily from 4% in 1952 to over 70% in 1960. By 1966, over 90% of newborn children were vaccinated, and the coverage was almost 100% in 1979.

As a result of all these measures and the general improvement in socio-economic conditions and living environment of the population in Hong Kong as a whole, a steady decline in TB morbidity and mortality has been recorded since 1952. The TB notification rate dropped at an average annual rate of 5%, while TB mortality rate dropped by 10% annually. By 1979, TB deaths only accounted for 2% of the total deaths. The decline in the rate among infants and young children was especially significant.

3. *CHANGES IN MORTALITY PATTERN BY AGE*

Rapid decline in TB mortality has brought about significant changes in the overall mortality pattern. BCG vaccination has successfully reduced deaths in infancy and early childhood. On the other hand, effective chemotherapy has helped to achieve better prognosis for patients with acute and chronic fibro-caeous diseases.

As a result, the age pattern of TB deaths has changed; the mode of the age distribution previously located at the very young ages gradually shifted to the older age groups. The average age at death of patients suffering from TB rose rapidly from 25 in 1952 to 56 in 1969. The shift in the age pattern of TB deaths has become more gradual in the last decade as the TB mortality rate had already reached a fairly low level. The average age at death stood at 61 years in 1979.

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The percentage of TB deaths of persons under the age of 5 declined from over 34% to less than 1% over the period 1952 to 1979. Infant mortality from TB dropped from 3.5 deaths per 1,000 live births in the early 1950's to 0.01 in 1979.

17.2 PERCENTAGE OF NEWBORN CHILDREN RECEIVING BCG VACCINATIONS AND TB DEATHS IN INFANCY AND EARLY CHILDHOOD, 1949–1979 (SELECTED YEARS ONLY)

Year	Percentage of newborns receiving BCG	% of total TB deaths under 5	% of total TB deaths under 1	Infant mortality rate from TB (per 1,000 live births)	Infant mortality rate (per 1,000 live births)	Average age at death of TB patients (year)
1949	—	34.0	8.3	3.96	99	26
1952	4	34.3	7.1	3.50	77	25
1954	4	31.2	8.2	2.82	72	29
1959	60	18.2	5.6	1.17	48	37
1964	87	4.1	0.9	0.12	26	48
1969	91	1.0	0.3	0.05	23	56
1974	96	0.8	0.2	0.02	17	59
1979	98	1.0	0.2	0.01	13	61

Due to the lack of accurate estimates of the age and sex distribution of the population in Hong Kong for the years before 1961, the effect on TB mortality brought about by the change in the age and sex pattern of the population at risk cannot be isolated effectively. However, based on the crude estimates of the population pattern obtained through the reverse survival process using 1961 Census data, it may be stated generally that the age effect of the population was only marginal.

17.3 TB DEATHS AND PERCENTAGE OF TB DEATHS TO TOTAL DEATHS BY AGE GROUP, 1949–1979 (SELECTED YEARS ONLY)

	1949		1959		1969		1979	
Age group	TB deaths	TB deaths as % of total deaths	TB deaths	TB deaths as % of total deaths	TB deaths	TB deaths as % of total deaths	TB deaths	TB deaths as % of total deaths
0	217	4.0	121	2.4	4	0.2	1	0.1
1–14	794	19.2	402	12.3	25	3.7	6	1.0
15–29	358	25.3	144	16.5	59	9.2	12	1.0
30–44	683	32.5	535	22.9	169	10.7	46	3.0
45–59	424	25.1	668	18.3	566	12.8	136	2.7
60 & over	135	9.1	306	6.1	647	6.7	322	2.0
All ages	2,611	16.0	2,178*	10.8	1,470	7.8	523	2.0

*including 2 of unknown age.

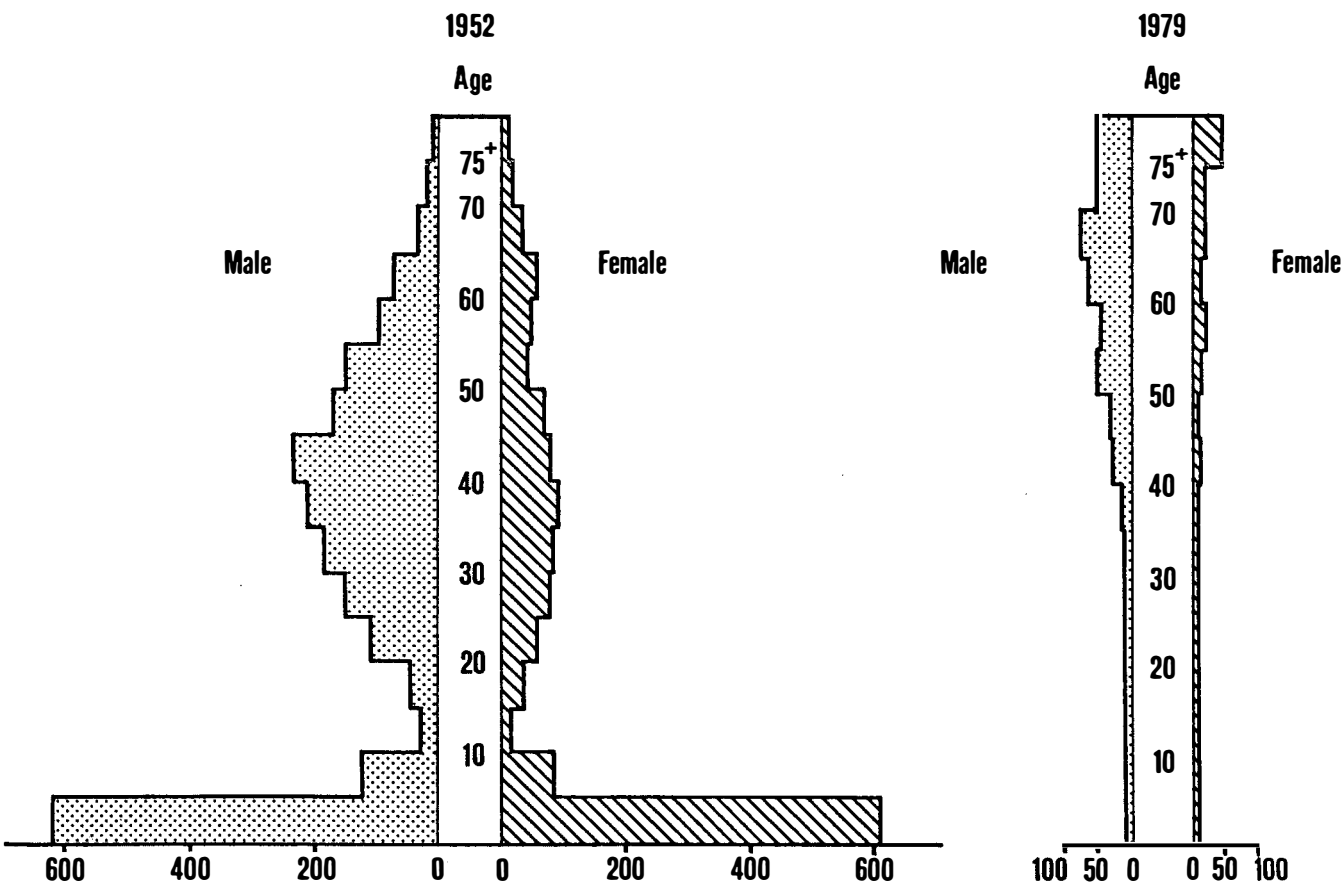
An alternative approach to isolate the effect on TB mortality of the change in the age structure of the population at risk is to relate TB deaths to the total deaths in the same age group and compare the proportion for different age groups over time. As illustrated in table 17.3, the most significant decrease in the proportion occurred in the youngest age group. Reductions in the older ages, although fairly significant, were relatively smaller.

17.4 TB DEATHS AND PERCENTAGE OF TB DEATHS TO TOTAL DEATHS BY SEX, 1949–1979 (SELECTED YEARS ONLY)

Year	Male		Female		
	TB deaths	TB deaths as % of total deaths	TB deaths	TB deaths as % of total deaths	*Sex-ratio of TB deaths
1949	1,497	17.0	1,105	14.7	1,355
1952	2,196	20.7	1,377	15.6	1,595
1954	1,762	16.6	1,114	12.9	1,582
1959	1,506	13.2	672	7.6	2,241
1964	1,060	10.4	381	4.8	2,782
1969	1,100	10.7	370	4.4	2,973
1974	769	6.3	205	2.1	3,751
1979	407	2.8	116	1.0	3,509

*males per 1,000 females.

CHART 3: CHANGES IN TB MORTALITY PATTERN, 1952–1979



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4. *CHANGES IN TB MORTALITY BY SEX*

TB deaths are more common among males than females. The improvement in the mortality rate was also more significant for females. Despite the fact that the sex-ratio of the population has become more balanced over the past 30 years, the sex-ratio of TB deaths increased rapidly from 1,355 males to 1,000 females in 1949 to as high as 3,509 in 1979. This may partly be attributable to the higher male incidence rate and partly to the lower survival rate among males. The same phenomenon occurs in many countries in the world.

5. *INTERNATIONAL COMPARISON AND FUTURE OUTLOOK*

Despite the significant improvements achieved during the past 30 years, the level of TB morbidity and mortality in Hong Kong is still higher than that in more advanced countries in Europe and North America. Socio-economic and environmental factors do play an important role, as in most communicable diseases, in the control of tuberculosis, and Hong Kong is severely handicapped in these aspects.

17.5 TB DEATHS AND MORTALITY RATES IN SELECTED COUNTRIES

Country	(Year)	TB deaths	Estimated population (in '000)	TB deaths per 100,000 population
Canada	(1975)	278	22,831	1.2
U.S.A.	(1976)	3,130	215,142	1.5
England & Wales	(1976)	1,125	49,142	2.3
Sweden	(1976)	330	8,222	4.0
Switzerland	(1976)	254	6,346	4.0
Japan	(1976)	9,578	112,771	8.5
Hong Kong	(1979)	523	4,900	10.7
	(1976)	568	4,444	12.8
Thailand	(1976)	6,104	42,960	14.2
Singapore	(1976)	358	2,278	15.7
Philippines	(1975)	29,436	42,517	69.2

Source: World Health Statistics Annual, WHO 1979.

The declining trend in TB mortality and morbidity has slowed down considerably in recent years. The large influx of immigrants and refugees in 1979 inflated the number of notified cases. A major case-finding campaign directed at the hard-core cases and launched by the M. & H. Department in 1979 also increased the number of notifications. As a result, TB notifications and TB deaths showed an increase for the first time in the past 6 years; however, their effect on the long-term trend in TB mortality and morbidity has yet to be seen in the years to come.